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Capitalism, the Unpredictable

HE Agitation and Propaganda Department of the Central Party Committee in Moscow sometimes finds the going a little rough. There are pitfalls, even for the wary.

Even while the Politburo calls for turbines instead of butter, the home front sags with discontent, general malaise, and nagging doubts about the virtue of the Soviet system. Party propagandists have been hard at it, trying to work out a defensive position by parading successive scarehead distorted stories of desperate industrial crises in the United States. There are times, however, when it takes quite a bit of dialectic backtracking to interpret happenings in this capitalistic stronghold in terms of copy-book class conflict. With disconcerting abruptness the darn American industrialists persist in jumping in and out of the dogma groove as laid down by Engels, Lenin and the other theorists.

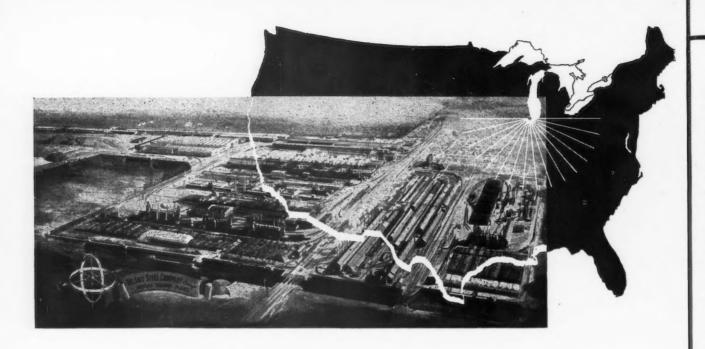
The unfolding industrial scene of the past week has been somewhat of a shock. For several months past, the Moscow propaganda boys have been quieting discontent by explaining the struggle between labor and capital in the United States in terms of classical Marxist doctrine as propounded by Soviet lecturers out of their textbooks for years. To use the Communist vernacular, the plot went something like this: Business fascists in the United States had captured the reins of government, and with the help of a venal press were compounding legislation to beat the workers back into slavery. By deliberately driving living costs to unbearable levels, the fascist provocateurs planned to force disputes just when labor unions were disorganized-rift by adventurers within and saboteurs without, in bad financial straights and serious public disfavor. Thus would the stage be set for the hammer blows of punitive legislation. Thus would labor be maneuvered into the vulnerable position of scapegoat for a business recession when and if it comes later in the year.

In the United States the Daily Worker worked over the same plot and added a few extra trimmings for the faithful. Even Philip Murray, no communist, crypto or otherwise, was so carried away as to accuse big business of similar diabolic intentions.

Then, what happens! Major industries all over the land are signing new contracts. Wage terms are more generous than unionists had dared hope for. Other concessions serve to bolster union leadership, prestige and power. Management and labor are making sounds like peace and good will.

The professionals in Moscow are probably busily digesting this unexpected economic demarche. Maybe they'll be able to regurgitate it into some distorted pattern acceptable to the Russian home public. It isn't completely beyond the resources of a Department that managed overnight to change an imperialist war into a fascist-democracy struggle and is able to make a dictatorship look like Simon-pure democracy. On the other hand, they may just let the whole thing get lost in the shuffle, and concentrate on the more windy speeches of the Council of Foreign

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April 29, 1947

- Within the next few weeks the Army will attempt to put its Bell XS-1 supersonic plane through the trans-sonic range of 650 to 900 mph and into the supersonic range. Lockheed engineers believe that practical military planes can be built within the next 3 years to exceed the speed of sound. Bell Aircraft is now building the XS-2, a stainless steel ship designed to have five times the power of the XS-1 and fly even higher than the designed altitude (80,000 to 90,000 ft) of the XS-1. Stainless was selected for fear high frictional heat would melt aluminum.
- Instead of simplifying the nation's industrial planning for war, unification of the armed services <u>will increase the red tape</u> unless present practice is changed. During the war the Army and Navy filtered their procurement needs through the War Production Board. Now there are three separate agencies <u>working inde</u>pendently and at cross purposes on the problem.
- ➤ Strategic stockpiling has reached the point where it is planned to store magnesium ingots in steel housing.
- ▶ Operation of blast furnaces on top pressures of 10 to 12 1b has produced restrained optimism after about a year's experience. One furnace currently operating on a burden including sinter and scale is yielding 1472 tons of iron daily with a 1690-lb coke rate and 119 lb of flue dust. Basic principle of the high top pressures is to slow down the linear velocity of gasses passing through the charge.
- ► Typical of the continued demand for automobile replacement parts was an order received by a small Ohio shop for 100 replacement rear axles for the Dort car. The California parts buyer swears a museum did not place the order.
- Newest English version of jet engines is the two-stage DeHavilland design. American advocates of <u>multiple stage</u> jets are in direct opposition to the English version—absolute simplicity in operation, fabricated at lowest possible cost.
- In the concentration of ores the trend for many years has been away from the use of gravity tables in favor of flotation processes. Now the trend is starting to reverse itself as improved gravity concentration techniques are being used for pre-concentration of ores before flotation.
- The poor grade and lightness of scrap being received by openhearth operators has led one company to threaten to take over all scrap preparation itself or purchase scrap on the basis of weight per cubic foot. Recent purchases of heavy melting scrap have varied as much as 100 lb per cu ft. Former strict grade restrictions are also reappearing.
- ➤ One auto manufacturer now features a brake that is <u>self-adjusting</u> as the lining wears. Another improvement on the way to eliminate locked bumpers is <u>standard height bumpers</u> that will not rise above or dive below 18.25 in. on a <u>normal stop</u>. All manufacturers will adopt them.
- Steel consumers may take some credit for the recent changes in steel extras and those yet to come. When the smoke clears away steel buyers' cantankerous way of looking at high extra charges will have knocked off \$20 to \$25 million from the overall delivered price bill when gaged on a 60 million-ton finished steel years.
- The unusual suggestion has been advanced that some interesting benefits may be obtained by combining oxygen enrichment of the blast furnace with high top pressures. But the idea presents several operating paradoxes and has not yet gone any further than some theoretical calculations.
- A governmental move is again under way looking to improvement of social and economic conditions of migratory workers. Several federal agencies are seeking data on industrial migrants, their areas of employment, living conditions, etc.
- A bright idea saved WAA from getting stuck with about 12,000 gal of rope preservative. Stored in rusting drums, rope makers were not interested in chemicals which would turn their product green. The head of the paint section in Chicago remembered that fishermen soak their nets in such chemicals, and presto—most of the stock was sold for this use—balance to China through UNRRA.
- Concrete reinforcing bar supply is still so tight that one engineering firm is planning to buy alloy steel ingots for conversion to ordinary concrete bars.

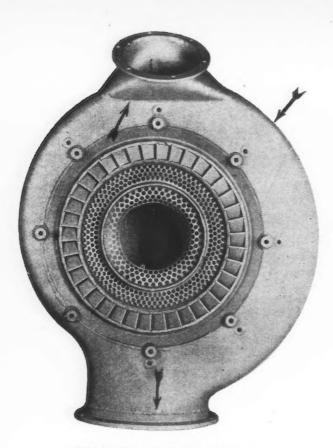


FIG. 1—Turbosupercharger nozzlebox on which the welds indicated by arrows were made by atomic hydrogen welding with flux on the underside of the joints.

Effects of Flux In Welding Stainless Steel

By G. RICHARDSON

Thomson Laboratory, General Electric Co., Lynn, Mass.

Small cracks appearing in welds made in stainless steel by the atomic hydrogen process, with flux being used in the underside, led to an extensive investigation of the effect of various types of fluxes on this type of weld. The causes of these cracks, as ascertained by this investigation, and the detrimental effect of fluxes rich in borates on welding operations in stainless are described in this article.

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EARLY in the development of the turbosupercharger, atomic hydrogen arcwelding was found to be most suitable for the modified type 316 stainless sheet metal parts, such as nozzleboxes and cooling caps.

In this process, the welding heat is generated primarily by the recombination of atomic hydrogen produced by dissociating hydrogen in its normal molecular state through the agency of an electric arc. The arc is completely surrounded by an atmosphere of hydrogen which performs the double function of shielding the molten weld metal from oxidation and of transferring the heat from the arc to the work. When the atomic hydrogen comes in contact with a relatively cold object such as the surface of the weld area, a rapid recombination of the atoms takes place with a resulting liberation of intense heat at or near the cold surface.

Since the hydrogen gas reduces most oxides present and protects the molten metal on the top side of the joint from the atmosphere, no fluxes are needed to protect the molten weld pool.

In the case of square groove and flange butt joints where 100 pct penetration is required when welding

from one side, it is necessary to protect adequately the underside of the weld from the atmosphere.

One of the most suitable ways of doing this is by introducing hydrogen. In building the turbosuper-chargers this was not feasible on many parts, such as the nozzlebox, because of the irregular nature of the joints to be welded (See fig. 1), so flux was considered the most suitable means of protection.

A procedure was developed whereby welds with good appearance and satisfactory physical properties were obtained. The flux selected was one which did not corrode the surface of the material when it was not removed after welding and before annealing in an open furnace.

During the course of production, a large number of parts were rejected because of small cracks, especially at the intersection of two welds. Investigation revealed that some of these cracks were open, but in other cases a condition was found similar to that illustrated in fig. 2. This sample shows the unetched cross-section of a flanged butt joint where a flux was used on the underside of the joint only. A high magnification picture of the same section is shown in the etched condition in fig. 3. The photomicrograph

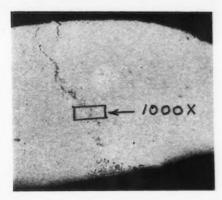


FIG. 2—Unetched cross-section (25X) of a flanged butt joint where flux was used on the underside of the weld.

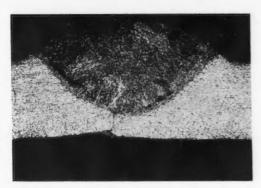


FIG. 4—Examination of an apparently sound weld (10X) indicates that penetration was not complete and that the weld metal on the underside had flowed through the joint to create a brazed condition. Etchant 10 pct oxalic acid.

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nown raph shows a constituent similar to a eutectic present in the crack, often referred to as a "eutectic."

Another condition which frequently contributed to failures is shown in fig. 4. This weld was judged by visual examination to have 100 pct penetration. It can be seen from the etched cross-section (fig. 4) that the actual penetration is much less than 100 pct and that the bottom part of the weld is little more than a braze caused by the eutectic wetting the surfaces of the parent material at the high welding temperature, and flowing by capillary action through the unwelded part of the joint, and out across the underside

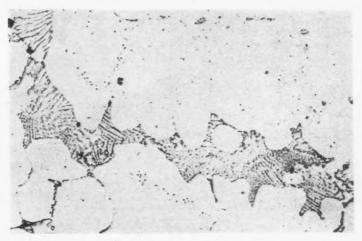


FIG. 3—Enlarged view (1000X) of the section indicated in fig. 2, showing the existence of a eutectic constituent. Etchant 10 pct

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In order to determine whether or not flux was responsible for the "eutectic" constituent in fig. 3, a series of test samples, using modified type 316 stainless, was welded by the atomic hydrogen process. Flux was used on the underside of the joint. For comparison purposes eight different types of commercially advertised fluxes for welding stainless steel were used. Samples were also welded using hydrogen backing. After welding, the test pieces were crosssectioned and studied under the microscope in the unetched conditions. Investigation revealed that the fluxes could be classified into two groups; Group 1 containing fluxes that produced a eutectic on the underside of the welds; and Group 2 or those that did not. Photomicrographs of typical examples of each group are shown.

Fig. 5 shows a weld made using a Group 1 flux. It will be noted that the weld metal has run back on the underside of the joint and apparently has fused to the parent material at a temperature lower than the melting point of the parent material. The higher magnification of this condition shown in fig. 6 shows that the low temperature part of the fusion zone is full of the eutectic constituent.

A cross-section of another test weld made using a Group 2 flux is shown in fig. 7, and a higher magni-

FIG. 5—Cross-section of a weld (12X) made with a flux rich in borates. Note how the weld metal has run back on the underside of the joint. Etchant 10 pct oxalic acid.

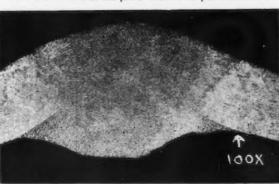
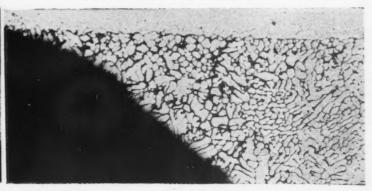
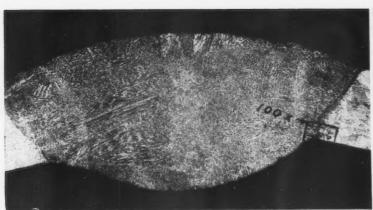
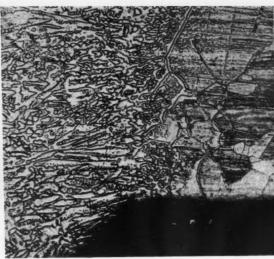


Fig. 5—Low temperature part of the fusion zone (100X) shown in fig. 5 in which the presence of the eutectic constituent is clearly evident. Etchant 10 pct oxalic acid.





F 1G. 7—Weld made with a flux containing little or no borates. Note that there is no tendency for the weld to run back on the underside. of the joint. (15X) Etchant 10 pct oxalic acid.



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FIG. 8—Enlarged view (100X) of the joint shown in fig. 7 indicating that the eutectic constituent does not appear to be present. Etchant 10 pct oxalic acid.

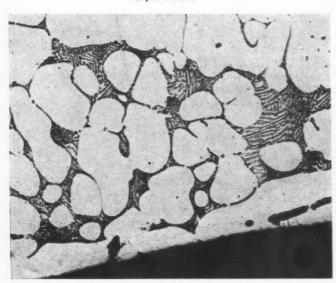
fication of the underside of the weld is shown in fig. 8. It will be noted that there is no apparent tendency for the weld to run back on the underside of the joint and the eutectic constituent does not appear to be present.

Similar examinations of joints made with hydrogen backing to protect the weld metal showed that no run back of the weld metal occurred, and micro examination did not reveal the presence of any eutectic constituent.

Inasmuch as the above weld tests had been made with the atomic hydrogen process, a question arose as to whether or not the eutectic constituent would occur in welds made with oxyacetylene welding.

Since type 316 stainless does not lend itself readily to the oxyacetylene process, samples were made by both processes using types 347 and 321 stainless. Examination of the cross-sections of the welds made using Group 1 fluxes showed the eutectic constituent to be present in the welds made with both processes. The structures of the welds made with the oxyacetylene process using Group 2 fluxes were also similar

FIG 9—Photomicrograph (1000X) of a weld made with borax as a flux Note the large amount of eutectic constituent Etchant 10 pct NaCn.



to those made with the atomic hydrogen process using the same flux. This indicates that a change of the welding process does not affect the results obtained using flux.

Having established that certain fluxes apparently combine with the molten weld metal to form a eutectic, it was suspected that heating at high temperatures would allow the eutectic to go into solution. Samples from a weld made with a Group 1 flux having a eutectic on the underside were heated to 1800°, 2100°, and 2300°F for ½ hr, respectively. Examination of these samples showed that no solution of the eutectic had taken place in the samples heated to 1800° and 2100°F. However, in the samples heated to 2300°F the eutectic disappeared, apparently going into solid solution. Since the annealing temperatures for austenitic stainless steels are in the range 1800° to 2100°F, it can be concluded that this eutectic will not be removed during manufacturing practice.

To establish at what temperature the eutectic constituent forms, a series of samples of type 316 stainless, 1/16 x 1 x 4 in. were fluxed with a Group 1 flux, which created the eutectic, and placed with their fluxed sides together in an oil-fired furnace for 10 min at 2300°, 2400°, and 2500°F respectively. The samples were then cross-sectioned and examined. This examination showed that only partial fusion had taken place in the samples heated to 2300° and 2400°F. However, the sample heated to 2500°F showed that complete alloying took place. It is evident that some constituent in the flux alloys with the parent material, forming a lower melting-point eutectic. The above experiment bears out the contention that the flux will allow bonding to take place during welding, at temperatures lower than the melting point of the parent material, producing a brazing action which may easily be mistaken for a true weld.

In an attempt to determine which constitutent in the flux was responsible for the eutectic, chemical and spectrographic analyses were made of the fluxes used.

These analyses revealed that Group 1 fluxes contained large amounts of borates while Group 2 fluxes showed only a trace. In view of the fact that welds made with fluxes in Group 1 showed a large amount of flux eutectic, it was suspected that the borates present in the flux might be responsible for this constituent.

Welds were made using borax and boric acid as a

flux, and it was noted that the welds ran back and that a eutectic constituent similar to that in welds made with Group 1 fluxes was present. Fig. 9 shows a high magnification of the eutectic constituent in the underside of a weld made with borax. Note the similarity of the structure to that shown in fig. 3. This evidence suggests that the flux eutectic in welds is caused by the presence of large amounts of borates in the flux.

Welding Over Fluxed Welds

It was noticed in production that when welding over another weld at an intersection, and when repair welding small defects in welds, serious cracks developed. Since these cracks seemed to emanate from the underside of the weld, it was suspected that the flux eutectic was responsible. In order to prove this point, a series of samples were welded using Group 1 and Group 2 fluxes and hydrogen backing. To simulate repair welding conditions, the tops of these welds were re-fused, using the atomic hydrogen process and limiting penetration to approximately 50 pct of the thickness of the weld. Previous to repair welding, a section was cut from the test samples for micro examination, so that its condition, as welded, could be recorded for comparison purposes.

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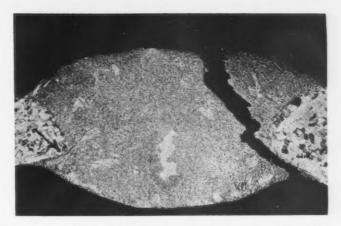
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During the repair welding of a test sample, which was originally welded using a Group 1 flux, a crack appeared on both sides of the weld. It was noticed that the crack was nearly in the center of the bead on the top side, and in the zone of the run back on the bottom of the weld.

Fig. 10 shows a cross-section of this cracked weld. Note that the crack extends for a considerable portion of its length in the weld metal directly adjacent to the parent material, also the crack in the opposite side of the bead which has not progressed through to the top of the weld.

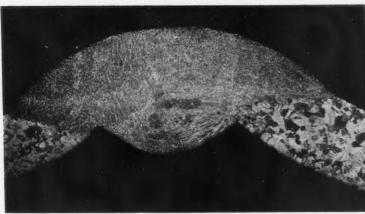
Fig. 11 shows a rewelded cross-section of a weld made using a Group 2 flux. There is none of the flux eutectic visible in this weld. However, repair welding caused cracking. Examination at higher magnification (fig. 12) revealed that a phase had separated from the weld metal, and that this phase was also apparent in the boundaries, and in the body of the grains of the



F lG. 10—Cross-section (15X) of a weld cracked by rewelding, using a flux containing borates. Observe also the partial crack shown by arrow. Etchant 10 pct oxalic acid.

parent material adjacent to the weld. The crack follows this intergranular phase. Previous test welding experience gave no indication that this phase was brittle in nature. Its appearance is such that it would not be considered a eutectic because, (1) it did not appear on primary solidification, (2) it has no apparent lamellar structure, and (3) there is no indication of a low melting material (run back on the underside of the weld). This phase is apparent throughout the weld metal which was not remelted by repair welding.

As a result of previous work it was found that the flux eutectic formed using a Group 1 flux could be put in solution by annealing at 2300°F for ½ hr. A weld was therefore made and solution heat treated and it was noted that the flux eutectic had gone into solution, with the exception of small amounts in the grain boundaries and in the body of the grain. Repair welding this solution-treated sample resulted in the condition shown in fig. 13. Note that there is general intergranular cracking in both the weld metal and parent material which indicates the weak brittle nature of the joint even after the eutectic has been largely dispersed by high-temperature solution treatment. The extension of the cracks into the parent



ABOVE

FIG. 11—Joints rewelded with a flux lacking in borates do not show eutectic constituents, but cracking still persists. (15X) Etchant 10 pct oxalic acid.

RIGHT

FIG. 12—Intergranular crack shown enlarged from fig. 11 (100X).

Etchant 10 pct oxalic acid.





FIG. 13—Repair welding of a solution treated joint made with a borate flux produced severe intergranular cracking in both weld and parent metal. (15X) Etchant 10 pct oxalic acid.

material indicates the weakness of the grain boundaries caused by diffusion of the flux eutectic constituent into the parent material. It may be argued that heating to 2300°F caused intergranular oxidation or burning of the parent material. However, since the solution treatment was done in a reducing atmosphere, there would be little danger of intergranular oxidation. Examination of the parent material away from the weld showed no signs of burning or grain boundary fusion. For these reasons, it is believed that the cracking found was due to the borates in the flux eutectic.

When welds originally made using hydrogen backing, were re-fused on the top side, it was noted that

no cracking took place in the sample.

In summing up, it seems safe to say that the major cause of cracking, in welding over stainless steel welds that are made using flux, seems to be a brittleness under thermal stress that is caused by alloying of the flux and weld metal. Fluxes which are rich in borates are extremely detrimental in this respect. Therefore, hydrogen backing should probably be used in all cases instead of flux, since welds made using hydrogen backing can be rewelded without danger of the cracks which result from an admixture of fluxing elements in the base material.

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Portable Inert Gas Metal Arc Welder

NERT gas metal arc welding of aluminum has taken to wheels on the portable unit shown in fig. 1, constructed by Aluminum Co. of America's welding section engineers. Although not intended for outdoor use, the unit was mounted on a road type trailer to facilitate transportation of the equipment between the sites of the several plants where it will be used, and to provide mobility at these locations.

The portable welding unit was specifically built for welding aluminum electrical conductors during construction and assembly operations, but it is readily adaptable to other applications. The inert gas metal arc process was selected for making these joints because no welding flux is needed.

This welding process for aluminum consists of drawing an ac arc between a tungsten electrode and the aluminum to be welded. The electrode and the molten aluminum weld pool are protected from oxidation by an envelope of argon gas which is inert to both materials and practically insoluble in aluminum. The high heat intensity of the electric arc permits the joints to be made quickly with a minimum heating. Both the welding torch and its power cable are water cooled.

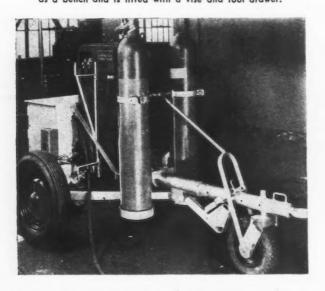
The three wheel unit shown in fig. 1 carries the welding transformer, cylinders of argon gas and connections for the water and drain lines. Electrical control provides protection of the torch against failure of water supply and also starts and stops the argon gas flow and power to the torch.

Twenty-five foot torch leads with a 50-ft extension permit welding in positions and places usually considered almost inaccessible. Although intended for use on aluminum electrical conductors, the portable unit satisfactorily joins aluminum tubing, extrusions, and sheet up to ¼ in. The resulting joints are smooth and bright with ample stretch and current capacity.

The unit requires a source of about 20 kva of 440 or 220 v 60 cycle power, and a source of clear, cool water of $\frac{1}{2}$ gpm at 50 psi.

For transporting the unit, the handle shown in position over the small front wheel may be brought forward for hand towing, or the entire wheel assembly may be removed and stowed upside down on the towing tongue by the removal of a single bolt, and the unit towed by any available plant vehicle.

FIG. 1—Side view of the portable welding unit. Cabinet at rear houses the controls and 75 ft of cable. Top serves as a bench and is fitted with a vise and tool drawer.



Modified Melting Practice Improves Bronze Pressure Castings

Improved structure and properties of bronze pressure castings resulting from the use of a cover compound and a degassifier, in addition to the usual deoxidizer, are discussed in this article. The author cites a series of tests run to determine the optimum amounts of cover compound and degassifier required to obtain the most beneficial effects. Cost of the additions and melting procedures used are also covered herein.

POUNDRY losses in the average brass foundry due to unsound castings are caused largely by poor melting practices. The melting procedure in most small foundries today does not call for the use of a cover or a degassifier prior to casting. Believing that the use

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on nor ole ure nt 10 ol in ht nne of these two measures, in addition to the usual deoxidizer, would have beneficial effects on the structure and properties of the bronze pressure castings produced at this plant, a series of heats were cast to determine the optimum amounts of a cover compound and a degassifier necessary to produce the most bene-

By S. W. WYSOCKI

Research Metallurgist, Bridgeport, Conn.

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ficial effects.

The results of this investigation indicate that:

(1) The use of a cover and degassifier produces a casting with higher physical properties.

(2) Improved density of structure is

obtained.

(3) Use of cover and degassifier will eliminate some foundry defects (other defects are remedied by sand, core and pouring temperature controls).

(4) The cost of melting 1 lb of bronze is increased by approximately \$0.00106 in changing over to the

TABLE I

Physical Properties of B61 Experimental Heats Using Cover and Degassifying Compound

	Average Physical Properties						C	Chemical C	ompositio	n			
	Yield Point,	Ultimate, psi	Elongation, in 2 in., pct	Cu	Sn	Pb	Fe	Ni	Zn	Sb	Р	s	Si
Meit No. 1 Standard melting practice using no cover Pouring Temp. = 2040° F	17,960	38,940	28.5	86.42	5.77	1.57	0.01	1.29	4.77	0.10	0.013	0.037	0.01
Melt No. 2 Using 2 lb cover 1.4 lb degassifier 12 oz phos-copper Pouring Temp. = 2040° F	19,946	46,250	37.8	86.82	5.58	1.58	0.01	1.27	4.46	0.11	0.029	0.033	0.01
Melt No. 3 Using 1 lb cover 1.4 lb degassifier 12 oz phos-copper Pouring Temp. = 2060° F	20,760	44,680	33.0	86.92	5.65	1.56	0.01	1.38	4.29	0.11	0.037	0.033	0.01
Melt No. 4 Using 3 lb cover 1.4 lb degassifier 12 oz phos-copper Pouring Temp. = 2080° F	19,460	43,090	30.4	86.64	5.74	1.58	0.01	1.28	4.58	0.10	0.020	0.037	0.01
Melt No. 5 Using 1 lb cover 1 lb 6.5 oz degassifier 12 oz phos-copper Pouring Temp. = 2000° F	21,940	47,340	36.5	86.83	5.97	1.45	0.01	1.27	4.25	0.11	0.039	0.039	0.01
Melt No. 6 Using 1 lb cover 11.2 oz degassifier 12 oz phos-copper Pouring Temp. = 2040° F	21,850	46,520	39.9	86.98	5.88	1.40	0.01	1.35	4.19	0.11	0.038	0.032	0.01
Meit No. 7 Using 1 ib cover 1 ib 1 oz degassifier 12 oz phos-copper Pouring Temp. = 2060° F	21,480	44,760	32.5	86.95	5.80	1.42	0.01	1.32	4.28	0.11	0.037	0.035	0.01

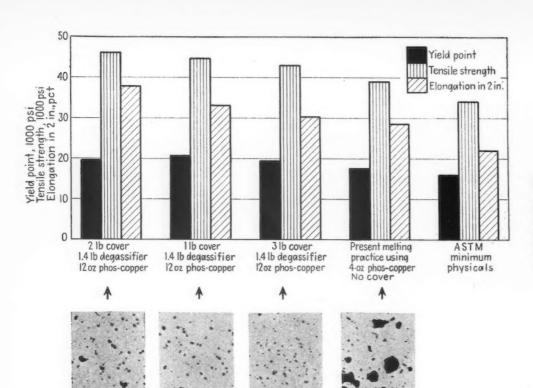


FIG. I — A comparison of physical properties of bronze castings resulting from the use of a variable amount of cover compound and a fixed quantity of deoxidizer and degassifier.

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use of a cover and degassifier in the proposed melting procedure.

(5) By the use of this cover and degassifier the training of melters to perform exact operations is eliminated since these materials tend to prevent troubles resulting from poor melting practice.

In conducting the investigation on which these results are based, one series of heats was cast using a standard amount of degassifier and phos-copper (deoxidizer) but varying the amount of cover used in the melting-down cycle. Another series of heats was cast, after determining from the above experiment the approximate weight of cover that gave the best physical properties and sound structure, in which the weight of cover used was held constant, but the amount of degassifier was varied. Standard ASTM tension test bars were cast for all experimental heats. All heats were made in a Repel 3 phase, 220 v, 375 amp, 60 cycle arc furnace. The cover compound used in these tests was Cuprex and the degassifier was Foseco R61.

A typical melting log for one of the heats is as follows:

vs:		
Tin	ne	Comments
9:36	a.m.	Cover compound added to bottom of furnace; metal charge added consisting of 2 lb nickel-copper shot, 150 lb new B61 ingot, 125 lb scrap B61
9:38	a.m.	Electrodes lowered partially Amperage—250 to 300 amp
9:40	a.m.	Electrodes completely lowered Amperage—265 amp
9:49	a.m.	Bath stirred Amperage—235 amp
10:04	a.m.	1.5 lb zinc added; bath stirred

10:06 a.m. Bath stirred

10:10 a.m. Degassifier added to bottom of clean preheated ladle and metal poured

10:11 a.m. Metal in ladle stirred and skimmed; temperature recorded

10:12 a.m. Castings poured

Fig. 1 gives a comparison of the physical properties resulting from the use of a variable amount of cover compound but a fixed weight of degassifier and deoxidizer. Heat made using no cover or degassifier

1 Products of Foundry Services, Inc., New York.

shows large gas holes and micro-shrinkage cavities. The heats made using a cover show no gassing or shrinkage cavities. The fine, evenly distributed black particles in the micrographs are lead.

Fig. 2 shows the physical properties obtained on three different heats of B61 material using 1 lb of cover material but varying the amount of degassifier compound used prior to casting. Note the absence of gassing and shrinkage cavities in the unetched photomicrographs taken of these various melts. Table I lists the physical properties and chemical analysis of all the experimental test melts.

In practice the cover compound is always added to the bottom of the furnace prior to charging. The degassifier is added to the bottom of a clean pouring ladle, the metal is poured on top, stirred, and when reaction stops, dry sand is added and skimmed. The molten bath is then deoxidized, as usual, with phoscopper.

The cover is added to the bottom of the furnace to act as a protective cover to the cold charge. It degasses to a limited extent as it develops an oxidizing

atmosphere preventing the absorption of reducing gases. The melting time should be checked for each furnace in order to avoid unnecessary soaking or overheating. The degassifier is added to the bottom of a clean pouring ladle in order to degas metal, to obtain maximum density, and also increase physical properties.

Phos-copper is added because it readily combines with oxygen, thus reducing oxides formed in the melting of the alloys. In addition to acting as a flux, it makes the metal run more freely and helps it to become thoroughly alloyed.

On the basis of these test heats, the following recommendations are made for the casting of bronze pressure castings:

(1) That the 1 lb of cover and 11.2 oz of degassifier be used per heat of 280 lb in order to obtain maximum benefits.

(2) That a foundry melting log be set up and strictly adhered to.

This article does not attempt to cover the theories of gas absorption, furnace atmospheres, etc., but rather attempts to point out that using certain precautions in the melting procedure, gas absorption and oxidation can be minimized, thereby producing sounder castings.

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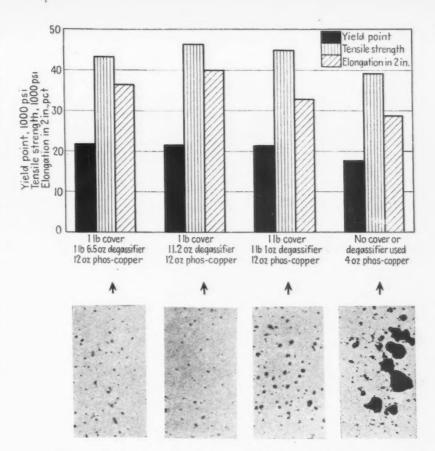


FIG. 2—Physical properties of bronze castings resulting from the ues of a variable amount of degassifier and a fixed quantity of cover compound.

United Engineering Casts 472,000 lb. Press Frame

OMPLETION of a cast steel forging press frame weighing 472,000 lb is reported by United Engineering & Foundry Co., Pittsburgh. This casting, fig. 1, said to be the largest steel machinery casting ever produced, was turned out at the New Castle plant of United for Ajax Mfg. Co. It will be used as a frame for a 6000-ton forging press.

The pattern for the casting, made by the Eclipse Pattern Co., Pittsburgh, required over 30,000 ft of lumber. More than 2500 man-hr of labor were required to build it.

The mold, fig. 2, was formed in a pit 18 ft wide, 39 ft long and 16 ft deep. After the pattern was removed

and the cores set, hot air was circulated for 7 days through the mold to remove all traces of moisture.

Four openhearth furnaces poured molten steel simultaneously into four ladles, which in turn were carried to the pit by overhead cranes. The 600,000 lb main pouring was accomplished in 41/3 min, after which 100,000 lb of additional molten metal was poured at intervals to make up for shrinkage.

The casting was then allowed to cool in sand for 2 months. Another month was spent in removing cores, heads, gates and risers, and in cleaning the casting surfaces. A special 90-ft freight car with 12 wheels at each end was required to carry the heavy casting.

FIG. I

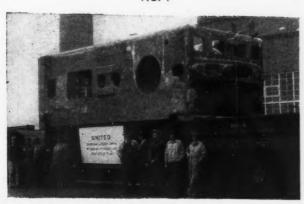


FIG. 2



THE IRON AGE, May 1, 1947-49



E. L. Ramsey, Supt., steel production, Wisconsin Steel Works, South Chicago, chairman of the AIME National Open Hearth Steel Committee.

· · · Steelmakers Weigh

AIME openhearth and blast furnace conference highlighted by discussions of oxygen use for combustion and carbon reduction . . . Meeting attracts attendance of 1000 . . . High top pressures, raw materials, refractory improvements also covered . . . McKune award won by paper on direct oxidation.

EW developments in steelmaking practice involving the use of oxygen in both the blast furnace and openhearth highlighted the discussions at the annual conference of the AIME National Openhearth Steel Committee and the Coke Oven, Blast Furnace and Raw Materials Committee held the past week in Cincinnati. With an attendance in excess of 1000, the conference featured some of the liveliest discussions encountered in the openhearth committee's 22 years of activity. As a sidelight on the development of the openhearth group, old timers compared the registration of better than 1000 with the 25 men who attended the committee's first meeting in Pittsburgh in 1925.

The conference was opened on Monday with an extensive tour of the coke and sintering plant of American Rolling Mill Co. at Hamilton and the company's steel works at Middletown.

The annual McKune award was presented this year to E. B. Hughes, foreman, openhearth metallurgy, Steubenville Works, Wheeling Steel Corp., for his paper on "Direct Oxidation." An abstract of this paper is published in this report. The annual fellowship dinner on Tuesday, with L. F. Reinartz serving as toastmaster, featured an address by C. R. Hook, president of Armco.

Under the respective chairmanships of E. L. Ramsey for the openhearth group and A. J. Boynton of the blast furnace committee, the technical sessions at the conference covered a variety of pertinent operating problems. While the sessions devoted to the use of oxygen attracted particular attention because of the current interest in this subject, the sessions devoted to other phases of steelmaking received their due share of attention. This was particularly true of the meetings in which the speakers discussed such subjects as high top pressure in blast furnace operation, hot metal quality, new developments in refractories, raw materials, scrap charging practice, pig iron substitutes and manufacturing steel to harden-

ability range, to name a few of the subjects covered. Space limitations unfortunately do not permit a discussion of all the excellent papers presented at the conference. However, in view of the current interest in oxygen¹ use in steelmaking, extended ab-

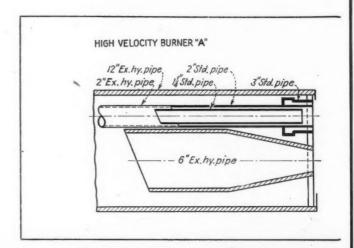
A general review of basic considerations in the use of oxygen in metallurgical processes is given in "Oxygen in Steelmaking," THE IRON AGE, Nov. 28, 1946, p. 47.

stracts of several papers on various phases of oxygen use, and some comments on the general discussions, are presented herewith.

Oxygen Burners for Openhearth Use

The use of oxygen for enriching combustion air as a means of increasing the rate of scrap meltdown in the openhearth furnace was ably discussed by J. J. Golden, division superintendent of steel production, Gary Works, Carnegie-Illinois Steel Corp., in a paper entitled "Use of Oxygen in Openhearth Furnaces."

Golden's presentation was concerned primarily with



Oxygen Possibilities · · ·

a study of the features of various types of burners currently in use. Fig. 1 illustrates three typical designs; high-velocity burner A, high-velocity burner B and low velocity burner C. From a combustion standpoint, the most important difference in the various types appears to be the wide variation in the areas of the oxygen outlets, which results in appreciable differences in oxygen velocity at any given rate of input. For example, burner A (fig. 1) has an oxygen outlet of 2.175 sq in., burner B 0.719 sq in., and burner C, 26.056 sq in. With an oxygen flow of 25,000 cu ft per hr, the oxygen velocities obtained with these three burners are 460, 1392, and 38 fps, respectively, and with a flow of 30,000 cu ft per hr, oxygen velocities are 552, 1670, and 46 fps, respectively.

Wide variations in oxygen outlet areas and oxygen velocities are noticeable even between the two high velocity burners A and B, and since input rate and velocity, together with total time used, determine the amount of oxygen consumed, careful consideration must be given to optimum oxygen velocity and flow to achieve maximum savings in time and fuel.

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The operating data listed in table I indicate the comparative savings in time and fuel that can be obtained with the use of the three types of burners when applied to various types of charges. The savings values are misleading when considered in themselves, since an apparently high value is outweighed in some instances by a corresponding high oxygen consumption. The data in table I indicate that with hot metal charges in excess of 60 pct, the savings may not be sufficient to warrant the use of oxygen.

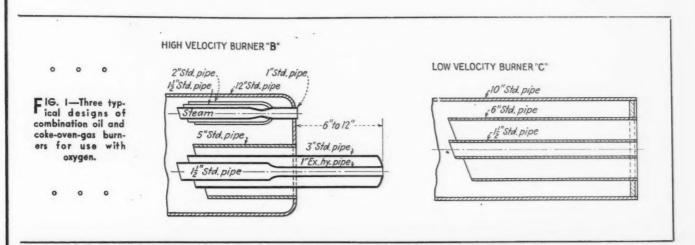
An experimental program was conducted, Golden reported in his paper, wherein a total of 21 test heats (with high scrap charges) were produced, utilizing high-velocity burner A. Ten of the heats involved the use of oxygen at 25,000 cu ft per hr, and 11 heats used oxygen at 30,000 cu ft per hr. Compared with normal combustion practice, the heats made at the slower oxygen velocity showed greater percent time

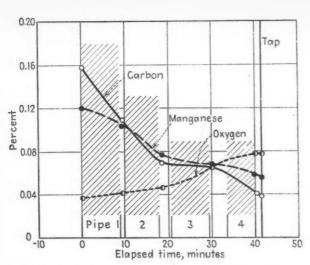


A. J. Boynton, A. J. Boynton & Co., Chicago, chairman of the AIME Coke Oven, Blast Furnace and Raw Material Committee.

and fuel savings than the heats made at 30,000 cu ft per hr. Conducting a similar test program with heats with high hot metal charges indicated that the savings obtained at 25,000 cu ft per hr again outweighed the advantages of using oxygen at 30,000 cu ft per hr. The author accounted for part of the relatively poor performance of the high scrap charge heats made at the higher oxygen velocity by stating that difficulty was experienced in attaining sufficient oxygen pressure and flow, and also that lack of adequate water cooling around the oxygen port was responsible for some irregularities in the operation of the burner during this period.

An interesting observation was reported by Golden, in the form of two curves indicating the comparative flame radiation intensities at each of the five furnace doors, for (1) normal combustion practice, and (2) using oxygen-enriched air. In the oxygen-enriched air practice, high luminosity in the first and second doors (82 and 66 my radiation intensity, respectively) indicated fairly complete combustion taking place in this zone, while on the outgoing end of the furnace





F IG. 2—Metal analysis of an openhearth heat as affected by introducing oxygen through a lance into the bath.

the flame radiation, 56, 51, and 50 mv at doors 3, 4, and 5, respectively, is actually less than with normal combustion.

Use of Oxygen for Carbon Reduction

The importance of another use for oxygen in the openhearth, that of carbon reduction², was under-

Experience of another plant with the use of oxygen for carbon reduction was described in "Use of Oxygen in the Openhearth Bath," THE IRON AGE, Feb. 20, 1947.

scored by the fact that the McKune award paper, prepared by E. B. Hughes, foreman, openhearth metallurgy, Steubenville Works, Wheeling Steel Corp., entitled "Direct Oxidation," was devoted to this particular function. The term direct oxidation refers to oxidation resulting from elemental oxygen introduced directly into the bath, as differentiated from the use of ore for oxidation purposes.

The value of this paper lies in the fact that it describes what can be done in a practical way with a limited supply of 1 million cu ft of oxygen (high purity) per month, at \$3.35 per 1000 cu ft, or \$80.40 per ton.

About 85 pct of production at Wheeling is steel containing from 0.07 to 0.10 pct C; about 10 pct is steel from 0.04 to 0.06 pct C, and 1 pct is 0.03 pct C or less. Under plant conditions it takes from 2 to $2\frac{1}{2}$ hr to work a heat from 0.10 to 0.04 pct C by conven-

TABLE I
Oxygen Enriched Combustion Air Operating Data

			Oxyger	n Input	Percent	Savings
Burner*	No. of Heats	Type of Charge	M cu ft per hr	Cu ft per ton	Time	Fuel
A	10 11 10 10	45% metal 45% metal 65% metal 65% metal	25 30 25 30	468 525 369 386	21.7 17.6 9.6 2.8	15.2 6.5 2.7 -5.3
В	4 4 7	Cold	9-18 9-18 9-24	684 326 369	22.6 24.1 14.8	18.7 11.2 6.8
C	5	40% metal	30-60	746	30.0	17.0

* See Fig. 1 for design of these burners

tional methods, and also, there is some difficulty in keeping the bath hot at the low carbon contents. The use of oxygen has remedied both these situations, inasmuch as the carbon reduction results can be obtained in not over 50 min, by blowing the bath with from 7000 to 20,000 cu ft oxygen, producing a two-fold fuel saving—one due to shorter heats, and the other due to cutting off the fuel during the period of direct oxidation. The latter saving is brought about by the fact that oxygen reacting with carbon imparts heat to the bath.

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Figs. 2 and 3 indicate the progress of a heat in terms of both metal and slag analysis. Fig. 2, showing the normal method in which the heats are worked, starts out with the heat on the cold side. The carbon is oxidized rapidly—from 0.16 to 0.07 pct in the first 20 min-accompanied by a slow buildup of oxygen content in the bath. As the carbon continues to oxidize, the bath temperature increases until a point is reached between 0.06 and 0.07 C, where both carbon and manganese react very slowly. At this point more iron is oxidized, which increases the FeO in the bath and slag, resulting in a high enough value that reaction takes place between FeO and carbon and FeO and manganese, thereby allowing the carbon-manganese drop to proceed again. In this particular heat, the flow of oxygen into the metal was approximately the same through each pipe, and each 20-ft pipe section burned back in almost the same length of time; 5220 cu ft oxygen were used in pipe 1 in 8.9 min, 4630 cu ft in pipe 2 in 7.9 min, 5640 cu ft in pipe 3 in 9.6 min, and 3700 cu ft in pipe 4 in 6.3 min. The test was performed using 34-in. diam pipes, 11/2-in. diam hose feeding the pipes, with oxygen pressure at 100 psi.

Experiments were conducted in which was compared the rate of pipe burning as related to greatest oxidation efficiency as measured by length of time of blow, amount of oxygen used, and amount of carbon oxidized. Keeping the end of the pipe from 6 to 10 in. below the surface of the steel gives the most rapid carbon drop with the lowest oxygen consumption. With a bath depth of 30 in., there is enough steel below the end of the pipe to protect the bottom from possible effects of oxygen. At this depth the pipe burns off at the rate of 2 to $2\frac{1}{2}$ fpm. A length of standard $\frac{3}{4}$ -in. pipe lasts about 6 min.

The depth to which the pipe is immersed below the metal surface is important in that it has a direct bearing on the oxygen efficiency. Further, highest efficiency results if the oxygen enters the bath in small streams and breaks up into fine bubbles, thereby giving the greatest steel:oxygen surface for reaction. The best combination of pipe size and pressure (or volume of flow) is such that the force is sufficient to keep the bath moving and yet small enough that the steel can close in on the end of the pipe and cut off the oxygen stream in small bubbles.

The effect of variation in blowing conditions is indicated in fig. 4, emphasizing the statements expressed above. The upper curve shows high oxygen consumption for rather slow carbon removal when a large pipe size is used with low pressure and indicates that a movement of the bath was lacking and that the oxygen was coming up through the metal in too large a bubble size for maximum effect. The lower curve includes three pipe-pressure-hose combinations which represent preferred practice. The most efficient combination was found to be ¾-in. pipe, 1½-in. hose at 100 psi pressure.

It can be noted in fig. 4 that there is a definite change in oxygen at about 0.12 pct C, in that starting

at 0.13 C and above, the oxygen consumption per point carbon removed is relatively low, while below 0.12C the amount of oxygen required increases rapidly with lower starting carbon contents. (The author points out that the values for oxygen consumption per point of carbon drop are approximations and do not represent actual values. The consumption values at the various "initial carbon" positions calculated as average values, i.e., total oxygen consumption divided by difference between initial carbon content and carbon content at end of oxygen blow.)

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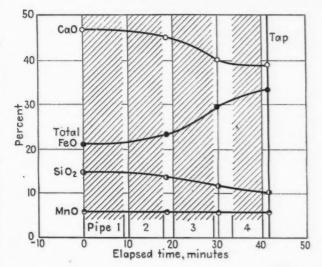
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Cold heats and accompanying difficulties can be more easily avoided, since one of the noticeable characteristics of direct oxidation is the heating of the



bath, the net effect is endothermic, because the heat liberated by the oxidation of carbon is less than the heat absorbed by the ore.

The comparison of thermal effects between ore as the source of oxygen and direct oxidation can be carried a step further. The heat absorbed by the reaction of a unit amount of carbon with ore is 61,940 cal. When this same amount of carbon is oxidized by oxygen blown directly into the bath, however, the heat liberated is 61,860 cal. In other words, oxygen reacting with carbon heats the bath to the same extent that ore chills the bath.

The author pointed out a rather interesting observation as to the economic advantage of direct oxidation by referring to a previously published estimate of \$60 per hr as the increase in total cost accompanying an increase in furnace time. Accepting this estimate for purposes of comparison, the use of 18,000 cu ft oxygen at \$3.35 per 1000 cu ft is repaid by the saving of 1 hr of furnace time. Another economic advantage lies in the fact that the ingot yield is 88.9 pct for heats made by direct oxidation, compared with 85 pct for ore heats. In reporting the work done at Wheeling with oxygen, the McKune award winner acknowledged the assistance of Air Reduction Co. in conducting the tests.

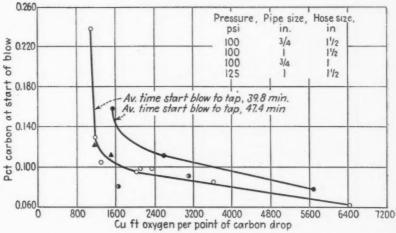
As regards the use of oxygen as an agent for carbon reduction, Golden, in the paper mentioned earlier in this report, expressed the opinion that at the present time it appears that savings in time and fuel resulting from the use of the lance are almost as great as the savings from using oxygen-enriched combustion air, with a much lower oxygen consumption;



FIG. 3—Slag analysis of the same openhearth heat as in fig. 1, indicating change in slag composition as affected by introducing oxygen through a lance into the bath.

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FIG. 4—Comparison of efficiencies of various oxygen pressure-pipe size-hose size combinations.

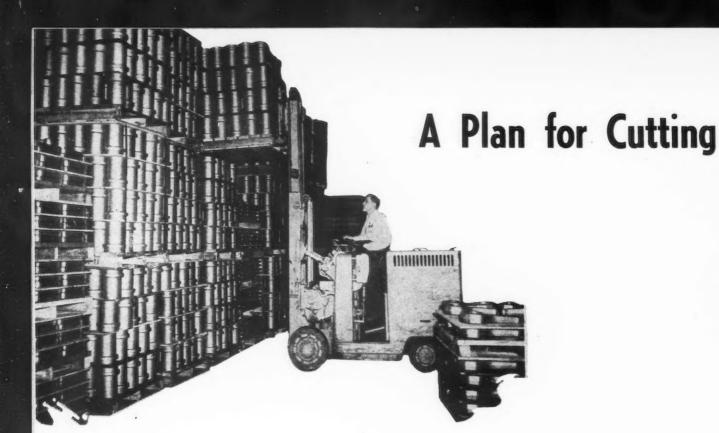


bath, the author stressed. Every element oxidized, iron, manganese, or carbon, is the source of some heat. More specifically, if the fuel rate set to prevent chilling with an ore addition remains unchanged, all of the heat liberated by direct oxidation is available to raise the temperature of the bath. For each 0.01 pct C oxidized by direct oxidation, the bath is raised 6.4°F. This effect shows the need for decreasing the fuel rate during blowing. A similar calculation based on the heats of formation and the specific heat of liquid iron shows that the bath temperature is raised 6° and 9.6°F for every 0.01 pct of iron and manganese, respectively, oxidized.

If oxygen is added to the bath in the form of ore, the amount of heat required to decompose the ore is lost from the net heat effect. In fact, in the case of carbon oxidized to carbon monoxide within the

and further experiments may show that, in the long run, the oxygen lance might be the more economical of the two methods.

Golden substantiated Hughes' data with the report that a plant using oxygen at 100 psi works heats down from 0.12 C to 0.04 C or less in 50 min. About 12,000 cu ft, or approximately 75 cu ft per ton of steel are used, and the time saved per heat is reported to be about 2 hr. The oxygen lances are ¾-in. pipe and last 8 to 10 min. A somewhat different procedure, Golden said, is followed at another plant where the oxygen is used from melt on down, or during the lime boil on high-melting heats. The oxygen pressure is 70 to 90 psi, and the flow is 50,000 to 65,000 cu ft per hr, or about 215 cu ft per ton. The average time saved on heats, which are mostly



The industry-wide drive for lower production costs is focusing the spotlight of potential savings on material handling procedures, for it is here where the largest potential economies appear to lie. This article proposes in detail a simple plan which enables management to spot expensive and time consuming handling situations and to plan effective corrective action.

THE need for new means of reducing production costs is now more urgent than ever; the national mind is focused on the dual objective of driving prices down and production up. No method is more obvious than cutting production costs. But the question is ... how?

In the past, progress in cutting production costs has been limited largely to improved mechanization of specific processing operations. But, now, industry must look elsewhere for savings. Generally speaking, plant operators have been engrossed in the job of perfecting processing techniques. Few recognize the materials handling problem and its controlling role in the cost equation.

In too few cases have top-grade men been charged with the responsibility of finding ways to cut the cost of handling materials. Manpower is still looked upon as the principal means available to unload common carriers, to supply machines, and to conduct storage and shipping operations.

Presented in this article is a three-step plan for plant management to apply to its particular operations. It is born of studies made by Yale & Towne Mfg. Co., Philadelphia, and has been developed in conjunction with Dr. V. S. Karabasz, associate professor of industrial management, Wharton School, University of Pennsylvania.

The plan is simple and logical, but the care and detail with which it is carried out in a plant will be the governing factor in its success. When it is applied it must be taken seriously and thoroughly. The net

result of such diligence will be a clear picture, not only of the weak spots in plant procedure, but of the steps to be taken by way of correction, and the dollar economies which will be effected thereby. th

pr a ce

Management's first move in applying this plan should be to appoint a staff, a staff instructed to scrutinize handling operations and costs with the same care and zeal that has led to such remarkable development of the processing techniques used throughout American industry. It is vital that this staff be given the authority to do something about its findings.

The accounting department will, in most cases, be of little help, because cost accounting systems, generally, do not set out separately the costs incurred in lifting, moving, and setting down again. It is common practice in time studies to absorb handling costs as part of processing cost, as part of department operating cost, or as part of indirect labor payroll.

Sometimes the staff is best built from engineering personnel, sometimes from treasury, sometimes from production and sometimes from the outside. It is often wise to go further than a single man or two—to organize a committee or new department to tackle the job. But however the problem is approached, it is imperative to select men who are assiduous in detail, enthusiastic about the opportunity, imaginative, and buttressed by authority.

The second step is getting the data. The staff should set about reducing to paper actual observed informa-

Production Costs · · ·

S. W. GIBB
Yale & Towne Mfg. Co.,
Philadelphia

tion and data. Here, organization of effort is most important. And it is in this phase of the work that the plan discussed here can be of maximum value.

One of the most useful means of spotting wasteful practices in materials handling, and doing it in such a way that the cure is indicated, is to follow a procedure not unlike the banding of wild life to trace their migrations. Thus, a sample incoming unit of

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some material or part or component of subassembly is selected, one which is as representative of the overall operation as possible, and its progress recorded through its entire history in your plant. In the case of a valve manufacturer, it might be 1000 lb of body castings received from foundry, and followed through every handling and movement and pause, through more than a dozen machining and assembly and test-

FIG. I—The first phase of the material handling study is the collecting of data as shown here. This form contains all salient information for analyzing the handling of a product.

(1) Description of Operation or Activity	**		(2)	2.13	. 1	(1)	(4)	(5)	Type of Equipment Used to Move	In load Ca-	100	(8)		.	(4)	(10)	120
(Name kind of material handled, such as castings, pipe, rods, liquids, cores, bulk materials, etc.)	peration	More	Weigh	Horag		No. of Men Required	Distance Moved in Feet	Time Re- quired in Minutes	Material from Location to Location (Manpower, conveyor, heist, dolls, poner, truck hand lift truck, hand truck, etc.)	pacify of Equipment (Pounds)	Load Shape	Length	Width	Meight	No of Units in Each Load	Foral Weight of Each Load (Pounts)	,
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TEMFORARY STORAGE A F DOLK	Õ	0		A	\wedge												=
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MOVE TO MACHINE PROCESSING	0	>		4		1	1100	8.45.	TRACTOR TRAILER	40,000	11 11	11	ee.	11	600	3,900	ch di
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TEMPORARY STORAGE	0	0		A	Δ] (
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MINE TO MACHINE	Ō	7			Δ	1	140	4'	ELECTRIC FORK TRUCK	6,000		1/	11	10	600	3,900	1
MOVE TO TEMPORARY STORAGE	0	-	D		Δ	1	125	5'	HAND LIFT TRUCK	4.000	60 11	11	11	44	600	3,400	13
TEMPORARY STORAGE	O	0		N	Δ					-							-
MOVE TO MACHINE	10	1			Δ	1	150	6'		11	60 60		11	**	600	3,900	
MOVE TO TEMPORARY STORAGE	O	4	D		Δ	1	180	6'40'	1. 1. 1.	11	h 11	(s	-15	tt.	600	3.400	1
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FINISHED PARTS STORES	0	0			∇			-		-			-				1
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TOTALS	3	18	1	8	2	22	3015	97:45	*******	XXXX	XXXX	XXX	XXX	XXX.	1 = ,640	81,900	_

ing operations, right up to and into the final carton shipped to the dealer. It might be a piece of paper, which according to one recent study, was found to travel $2\frac{1}{2}$ miles in an office of only 35 sq ft, most of it waste movement.

In the case used here is an illustration, the banded unit was a lot of 600 forgings received from the supplier by truck and processed by the company into the so-called universal-shaft-fork of a piece of portable machinery manufactured for use in the textile industry.

After the material-unit to be studied has been selected, a form with ten major columns is prepared, headed as shown in fig. 1. Note in column 2 that the analyzed operations are classified as: (a) Handling operations; (b) moving operations; (c) inspecting, weighing and packaging operations; (d) those temporary pauses between steps classed as temporary storages; and (e) those stocking or warehousing storages referred to as permanent. The actual processing operations (machining, welding, heat treating, filling, painting, and so on) are not listed. They are the domain of the process engineer, not the materials handling engineer.

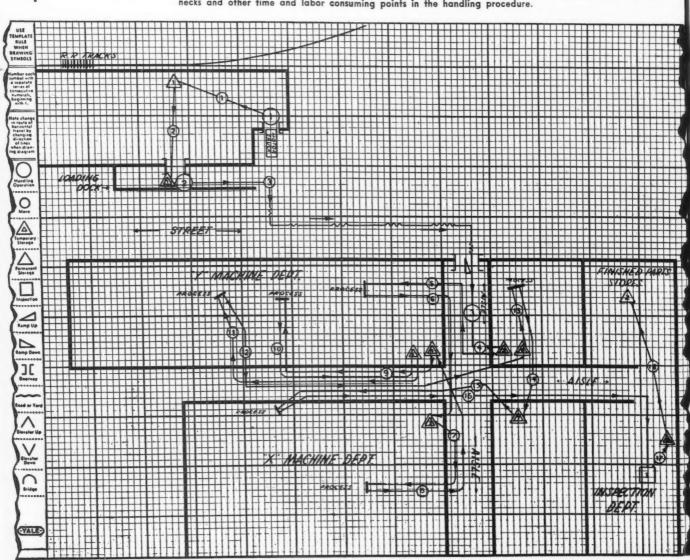
It is important that the form is complete, that it covers matters of manpower, time, distance, number of units, weight, equipment and load shape; that it lists, as a step, every single action involving movement or positioning of the sample load.

It is also wise to make a floor plan of the plant, charting the path followed by the sample material unit. This diagram with the tabular information should be filed. Fig. 2 is such a diagram for the lot of 600 forgings for which data are collected in fig. 1.

The plan should be to scale, and symbols should be used (see the key at the extreme left) to indicate ramps, doorways, elevators, bridges, outdoor movements, and each of the types of operations listed in column 2 of the tabular record (fig. 1). Such diagrams disclose desirable relocations of processing tools, storage zones and receiving points, and suggest such worth-while measures as the widening of aisles, the reduction of grades, and the like.

The actual case history used as an example in figs. 1 and 2 is of a well-planned materials handling sequence. The countless horrible examples so common in industry would yield tables and diagrams infinitely more

FIG. 2—A chart, to scale, of the flow of a product through a plant, such as is depicted here, is extremely valuable in revealing bottlenecks and other time and labor consuming points in the handling procedure.



complex and replete with opportunities for improvement of the system.

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Nonetheless, here are the facts of the forging plant case history covered in figs. 1 and 2: The forgings were rehandled to such an extent that, actually, 12,600 units were manipulated, not just 600; over 80,000 lb were handled, not the 3900 lb which represent the shipping weight; five different types of materials handling equipment were used; the total distance moved was the better part of a mile; more than 1½ hr was eaten up in transportation; 22 men, 3 handlings, 18 moves, and 8 temporary pauses were involved. In the diagram, it can be seen that a change of level was involved at three points, not to mention the many lifts involved in stacking at storage and picking-up-and-putting-down at every processing station.

Thus are the basic data collected and recorded for file. The prudent extent of collection of such data will be indicated by the case. It may be wise to study five or ten typical components, to make a separate study of office supplies, to trace subassemblies and finished products from the last assembly to the carriers which take them from the scene, or to analyze movements between plant buildings.

In any case, it is necessary to obtain complete and organized data. The system described here, as in figs. 1 and 2, can be widely applied to most any situation.

After the actual handling histories are assembled, proper summarization and interpretation can yield overall views which are almost invariably startling. One worth-while procedure is to study, as above described, one, or a few representative parts which go to make up the finished product and to multiply the totals for the representative part (the various columntotals in fig. 1) by the number of parts which make up the product.

One can obtain from this indications of the total tonnage and the total number of items, handled in the production of one lot of finished products. Generalization of the collected data to encompass all the plant operations may also be performed on a per-day or perweek basis—multiplying the totals for the representative part by the number of similar lots handled in the time unit chosen.

For instance, if the manufacturer of textile machinery, used in the example, were producing 40

machines per day, each with 900 parts of which the universal-shaft-fork was considered representative, the summarizer could calculate daily parts production as 36,000 or consider this volume equivalent to 60 lots like the sample lot of 600 forgings. Applying this factor to the column-totals in fig. 1, it is possible to estimate the number of parts handled per day as three-quarters of a million (12,600 times 60) and the tonnage handled per day as 5 million lb or 2500 tons (81,900 times 60). Some 34 miles of inside-the-plant hauling per day (3,015 ft times 60) could be observed. and 1260 separate handlings and movings of part lots (18 plus 3 times 60).

To these rather startling totals, of course, should be added smaller totals summarized from studies of the handling of the finished products after assembly, and from consideration of the various materials which end up as crates or packages, on a day basis. Such statistics, of course, are mere approximations. They can, however, be exact if the materials handling staff is sufficiently thorough to analyze every incoming item and every subassembly. But regardless of whether or not intelligent estimate or an accurate total is obtained, the evidence will be there.

The matter of new equipment (trucks, cranes, hoists and conveyors), the matter of loading methods (skids, pallets, skid bins), the matter of plant layout (aisles, elevators, docks, floor surfaces), and the matter of cost accountancy to segregate materials handling from processing charges, all resolve themselves logically and completely if surveys such as described here have been made.

Unfortunately, these matters are not so approached today. The business of materials handling to date has been primarily one of easing specific trouble spots after they become impossible to overlook, not one of analyzing the production problem as one of material in motion and seeking out opportunities for cost cutting.

Students of the business have variously estimated that portion of the production dollar invested in the simple business of picking-up-moving-and-putting-down to be from 15¢ to 40¢. In case after case such expenditures have been cut from 10 to 90 pct through intelligent materials handling analyses.

Steel Production by the Scrap-Carbon Process

BECAUSE of the scarcity in India of imported hematite pig iron for operating the pig-and-scrap process in the acid openhearth furnaces, the scrap-carbon process using 100 pct of steel scrap has been successfully used to maintain essential supplies of high grade acid steel. A discussion of this process is contained in the article "Manufacture of Steel Production in the Acid Openhearth Furnace by the Scrap-Carbon Process," published in the January issue of the Journal of the Iron & Steel Institute (England).

In operating the scrap-carbon process, the deficit of carbon in the charge is made good by the use of petroleum coke and the deficit in silicon by the addition of acid slag to the molten bath. The furnace hearth is protected from erosion during the melting of the scrap by spreading an easily fusible silica sand over

the banks before charging, while manganese is introduced into the bath by the employment of manganese ore instead of iron ore for oxidizing the carbon.

The history of a nickel-chromium steel heat made by the scrap-carbon process is given in the article as an example, and it is possible to make regularly any composition of steel by the standard practice adopted in India.

The quality of the steel manufactured by the scrapcarbon process is said to be as high as that obtained by the pig-scrap process. The acid hearths are not destroyed any more by the former than by the latter process, and the average time of heats from tap to tap has not been increased by the adoption of the scrapcarbon process. The yield of ingots from the metal charged is higher by the scrap-carbon process.

Basic Characteristics of Useful Industrial Laboratory Instruments

By J. S. Buhler New York

need for increased and high quality production during the war, North American Philips Co., Inc., instrumentation has become more widespread, and men rerather the gaining of a faithful ally in competitive production. As a result of advances in control techniques fostered by the sponsible for plant efficiency have come to recognize in proper instrumentation not merely an addition to capital outlay, but

was with the thought that a tabulation giving the essential elements in readily comparable relation, would be useful, that the following compendium was prepared. It does not pretend to cover the field completely, for each industry could is appropriate must often be made on the basis of comparison of functions. This is difficult when it becomes necessary to review texts or catalogs where motional emphasis on special features or refinements of a particular make. It well point out important types suited to its particular needs, but it does strive to Instrumentation is a wide and complex field and the decision as to which type the basic elements are frequently obscured by dissertations on theory or pro-

cover some of the most prominent or most-used types in such a fashion as to give the principle, constitution and outstanding uses in the most condensed form possible. In each case only the most vital elements are covered. Actual instruments may deviate in numerous refinements or "features." but the funda-

mentals are considered in this compendium to be most important inasmuch as to permit of comparison and the selection of apparatus most suitable to a given its prime purpose is to give the user a concise means of obtaining perspective,

It will be noted that a partial list of suppliers is indicated—except where the equipment is a specialty of a single company. Inclusion or omission of any manufacturer's name from the list should not be in any sense construed as an corporated merely for the purpose of giving leads to prospects. Fuller data on suppliers can be obtained from industrial indexes or catalogs. index of quality or efficiency of his product. This information has been in-

MANUFACTURERS OR SUPPLIERS (Partial List)	American Instrument Co. Central Scientific Co. General Electric Co. Jarrel-Ash Co. Rubicon Co.	Allan B. Dumont, Inc.	R.C.A. General Electric Co.
COMMENTS	Proper application requires Am careful study of factors in- volved and selection of in- Strument having proper char- Jar acteristics.	New setup must be made for alla cach check. Sometimes a new cases a new pattern results. Sometimes both. Equipment is leased and serviced by the manufacturer. Engineers must be called in to effect each new sorting setup.	Two models by R.C.A. Uni- R.C.A. versal to 20,000X Console to Genera 10 ° mm 1/5 to 2 min for both types.
APPLICATION	Used for comparison of color of solids, fabrics, paper, powders, liquids, blood, dyes, etc.	Useful where heat treatment and certain types of working are involved, in addition to sorting raw materials. Compiess a comparative method giving control within close limits in its specific field of application. An adaptation of this arrangement is available for automatic medium speed sorting.	Determination of particle size and shape, visual direct analysis, detection of impurities, structure studies, In metallurgy for ore analysis, process studies, grain and boundary examinations. In biology for examination of bacteria and viruses (which however, die one evacuation) can also be used for efections.
OPERATION	Bridge may be balanced and degree of unbalance read, or specimens interchanged after balance to give degree of difference. Various types of light sources and filters may be employed. Specimens may require rotation to eliminate effects of weave, sheen, etc.	Standard patterns and deviation limits set with acceptable or rejected as pseimens. Patterns produced by subsequent pieces are compared with standard patterns to ascertain whether they fall within established limits.	Specimen is placed in holder which is inserted in air lock. Unit is pumped down, interlocks preventing energization above proper pressure. Voltage is applied and image observed on screen or recorded on film.
BASIC ARRANGEMENT	Specimen 1 (%) Specimen 2 P.C. 1-7 G G ANN	Specimen Oscilloscope, Coil L. Electronic	Source coils source la
PRINCIPLE	Photo electric response to color. Od different types and arrangements, but in general employing photocells in bridge circuits to determine whether or not given samples reflect or pass equal degrees of incident light. Readings are usually comparative.	Works on basis of changes in permeability produced by processing of metals. Specimens are introduced into specially prepared coils, producing variations in cathode ray scope patterns which are indicative of the type of specimen or its treatment.	Employs electron beam with wave length shorter than that of visible light, permitting greater resolution and magnification. Beam traces made visible by use of fluorescent screen.
APPARATUS OR SYSTEM	Colorimeter (Color Comparator)	Cyclograph	Electron Microscope

Finely powdered specimen Same as for diffraction cylin- Faster than film method, re- North American mounted in adhesive on drical camera, with added fea- ducing time require to de- Philins Co.. Inc.

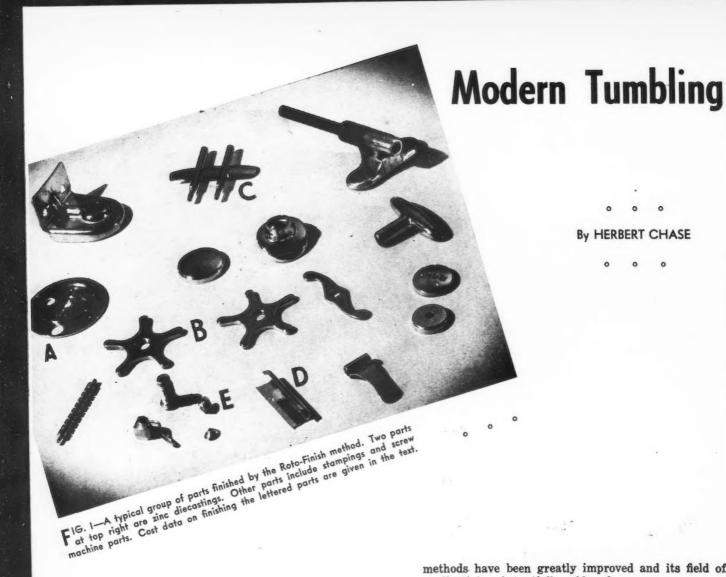
Geiger counter

Geiger Counter X-ray (See also X-ray Diffraction. Recording on chart of char-

North American Philips Co., Inc.	Magnaflux Corp.	Consolidated Engineering Co. Westinghouse Electric Corp.	G-M Labs. Cambridge Inst. Co. Caerner Scientific Co. General Electric Co. Photovolt Corp. Phota and Bauer, Inc.
Faster than film method, reducing time require to develop patterns, eliminating film processing, time and personal errors in measuring film or estimating density characteristics. Permits preparation of partial spectrolly, if desired, with further saving of time. Frequently changes in intensity or shifts of specific lines may be keys to changes in product characteristics and may be decertaristics.		Useful in study of isotopes (same properties but different molecular weights.)	Largely used for determination of light intensity. No particular applications in materials testing.
nowever, die on evacuation can also be used for electron diffraction. Same as for diffraction cylindrical camera, with added features of simplicity and speed facilitating use not only in research but also in process control.	Good for superficial and not too deeply buried or too minute internal flaws. Location of sub-surface flaws contingent upon degree of distortion of flux at surface and observability of such distortion.	Provides means for rapid analysis, particularly where distribution of certain components or their presence in relation to others must be quickly ascertained. Chiefly applicable to gases and volatiles.	For illumination measurements generally, lighting control, photography, etc.
Finely powdered specimen mounted in adhesive on glass slide, polished metal coupon, or equivalent sample, equi - distant from X-ray source and Geiger Counter is rotated in x-ray beam at half the speed at which Geiger counter passes over goniometer quadrant, Pulses from Counter are electronically conditioned cause trace on recorder chart, giving anequal dispositions and intensities of different heart hand intensities of different heart hand intensities of different hand hand hand hand hand hand hand hand	Powder either dry or in suspension caused to envelop part, after which properly oriented flux is created, with "bunching" of powder flaws (if on surface or not too deep and too small).	Specimen leaked across positive ray behind cathode, ions being accelerated by high worldage field, velocity filtered between electrically charged plates, then subjected to constant manserie field. Deflected ions follow individual parabolic paths according to masses of respective componnisses of respective componnists they represent. Record taken on film.	Light falling on sensitive ele- ment causes meter deflect- tion. Evaluation of intensity derived from reading of asil- brated indicator or from dif- ferential action, on basis of comparison with cell illum- ined by standard source.
Source Society and Specimen Goniometer	(a)-Part conducting (b)-Induced by coil (c)-Induced by central conducting bar	Sample Accelerator Sample plates Film Positive ray Selector generator plates	Light Meter Sensitive cell
(See also X-ray Diffraction. Recording on chart of characteristic patterns derived from crystalline substances subjected to x-radiation. Employs radiation source, specimen and Geiger Counter in focussing relationship. Counter outsing circuits to drive pen of strip chart recorder.	Location of variations of magnetic flux distribution at or near flaws (or variations of section) in ferrous or magnetic materials. Flux concentrations revealed by use of magnetic powders.	Deflection of ionized components of elements, compounds or mixtures by given electrostatic or electromagnetic or electromagnetic or electromagnetic depending on relative masses of components.	Employs light sensitive cells or tubes to evaluate the in- tensity or variation in intensity of light, (visible or ultraviolet).
Geiger Counter X-ray Recording Spectrometer	Magnaflux	Mass Spectrometer	Photometer

APPARATUS OR SVSTEM		Spectrograph	Spectrophotelometer	Spectrophotometer	(Film Method)
PRINCIPLE	Comparison of the trans- mission of equal thicknesses of solutions, suspensions or solids when placed in a light beam having a spectral band subject to absorption by the material investigated.	Formation of dispersed characteristic lines by passing radiation from substance at high temperature through a diffraction grating or prism and recording on film.	Development of photelometer. Incorporates concave reflection grating by which wavelength of light can be varied continuously over a specific spectral range, allowing curves to be made showing transmission over a hand.	Arranged for making spectral transmission and reflecting (1) a monochrometer whose emergent wave length can be controlled, and (2) an integrating sphere photometer whose fluctuating component of light (resulting from the unknown) can be evaluated.	Crystaline structures of substances functioning as diffraction gratings for imping-fing x-radiation produce arises of beams whose spacings and intensities are characteristic of the substances so irradiated.
BASIC ARRANGEMENT	Light Specimen source (Filter	Characteristic Innes Arc Orism Film Arc Grating		Monochromatic off-center relating prism parism adjustable adjustable A A A A A Meter	Specimen Film Specimen Film X (b)-Cylindrical film
OPERATION	Distilled water is employed as reference cell to establish 100 setting (using diaphragm). Series of samples then prepared in varying concentrations to get points for curve against which subsequent samples are checked.	Specimen placed in cored carbon, or used directly as an electrode if conducting. Gases are tested in suitable discharge tube. Are produced between electrodes, or in tu be, radiation passing through grating or prism to film.		Rotating crystal angle at zero balance of wat meter gives relation of sample and standard. Beam fluctuates from standard to sample due to rotation of off-center prism. When there is a mismatch, photocell is actuated accordingly and energizes one winding is coupled to the motor which oscillates the prism.	Finely powdered specimen or fiber is placed in a fine beam of essentially monochromatic x-radiation. Intensities and spacings of emerging beams are usually recorded on flat or cylindrical film and subsequently employed for computation.
APPLICATION	Employed for determination of alloying elements in steel, determination of lead, copper, iron in food, vitamin chemistry, medicinal work and general chemistry. For work on metals, chemical solutions or suspensions, must be prepared.	Shows presence of elements and to some degree their amount, Does not show state of chemical combination or give physical condition.		Used chiefly for transmission and reflectance prob- lems involving different wavelengths of light.	Employed in research, development and production. Velopment and production. Functions essentially as an instrument of identification, comparison and control for raw, in process or finished materials. Useful in distinguishing allotropic forms of substances which depthemical differentiation, in following or or checking ph as echanges and transformations determining states of solid solution, etc. Useful in molecular weight studies. Often pensive lengthy chemical analysis.
COMMENTS	Rapid, once curves are avail- able. Correlation must exist between transmissivity and physical or chemical char- acteristics. Sample must be translucent or transparent. Used for quantitative meas- urements.	Radiation employed ranges from ultravioler portion of spectrum to infrared. Film must be developed under carefully controlled conditions.		Since wavelength can be varied at will, reflectance or transmission can be plotted (or automatically recorded) for a desired wavelength or wavelengths. For opaque as am ple es, attachment A is omitted. For transmission sample, unknown is replaced by standard and sample is located at A.	Applicable chiefly to the study of crystaline materials. Exposures often require hours to which must be added film processing, density evaluation and measuring time. Minute samples can be used, even single crystals.
MANUFACTURERS OR SUPPLIERS	Centra	H. W. Dietert Co. Applied Research Labora- tories Hardy Co.	Central Scientific Co.	General Electric Co. Baird Associates Bausch & Lomb	North American Phillips Co., Inc. General Electric Co. Picker X-Ray

Magnaflux Corp.	General Electric Company North American Phillips Co., Inc.	Sperry Products, Inc.	Brush Development Com- pany Products, Inc.
Minimum flaw detectable depends upon size of flaw particle size of fluorescent material and surface tension of whicle; also upon minimum size of fluorescent particle visible. It should be noted that superficial and deep flaws may give essentially identical indications.	Specimen preparation requires great care. Rolls or finns must be essentially transparent. Surfaces must be extremely clean and representative. Slight traces of contaminating or foreign substances readily give own patterns.	Surface must be machined to permit intimate contact of test unit. Old or giverine film required for best coupling. Works best on symmetrical Objects having parallel faces. Mas having parallel faces. The range of 10 feet in lighter metal.	For best results materials must be immersed. For checking wide sheets, multiple units are required. Depth of flaws is not ascertainable; only that they exist. Standards must be set by acceptarial standards contoured parts presents difficulties.
Depends upon lodgement of fluorescent material in defects. Therefore defects must reach surface and also permit influx by straight flow or capillary action.	Useful in study of surface structures and thin foils on films due to fact electrons do not have the penetrating power of x-rays. Especially useful in corrosion studies, work on paints and in study of crystallization in chemical process.	ion of discontinuities is, blowholes, fissures) crous and non-ferrous gs and forgings, in ceramics, plastics and	Detection of presence of discontinuities of various types. This method lends itself particularly to work on laminated materials (such as bitwelds, plating and the bonding or homogeneity of sintered products.
Object (metal, plastic, etc.) is dipped in fluid compris- ing vehicle for finely divided fluorescent material. After a suitable soaking interval, the object its wypod free of excess material, then allowed to extend for an appropriate priod after which it is exited for an appropriate priod after which it is exited out under ultra-violet light. Fluorescent material lodged in or emerging from fissures and holes stands out.	Specimen if film or foll placed in chamber normal to electron stream. If heavy section, placed so beam grazes. Chamber then pumped down and high voltage (30-60 KvP) applied, pattern being recorded on film.		Product is lowered or (in case of continuous strip or dishet checking) run between driver which produces waves or other liquid medium. Variations from standard reading flux by flaw are indicated on meter or recorded on chart.
*Dipping Examination under Ultra-violet Light operation	Focusing	(up Flaw	Oscilloscope Object Driver Pickup Indicating meter or recorder (for continuous flow checking)
Location of fissures and holes on the surface, by liquid borne fluorescent material.	Diffraction of electrons by crystalline surfaces or thin sections.	Modification by flaws of waves above audible frequency which penetrate object.	
Zygło	Electron Diffraction	Supersonic (Ultra- sonic, Hypersonic)	
	Location of fissures and holes on the surface, by liquid the surface, by liquid the surface, by liquid the surface, by liquid the surface and light the surface and liquid the stand for an appropriate period strain and st	Defect (metal, plastic, etc.) on the surface, by liquid borne fluorescent material. After a reach surface, by liquid borne fluorescent material. After a reach surface and also permaterial and surface tension sultable scaking interval, the mit influx by straight flow material and surface tension sultable scaking interval, the mit influx by straight flow min size of fluorescent material and surface tension mined under	on the surface, by liquid to the surface of



By HERBERT CHASE

OO often bypassed in cost studies because of the attitude that "there's nothing new in tumbling methods," more and more plants are discovering that effective use of modern tumbling techniques offers many opportunities for reducing finishing costs. If the finishing problem is one of removing burrs, smoothing surfaces, erasing tool marks, performing what amounts to a honing operation or bringing up a luster-even one that is a close approach to buffing -the chances are that tumbling can supply the answer, at least on small parts. Such operations have been performed on parts as large as a standard office typewriter frame, although this is not common.

To some engineeers, the term tumbling conveys the thought of dumping a batch of rough castings or forgings into a barrel and letting it roll, to knock off fins, scale or rough edges. To others, tumbling signifies a fast turning steel basket in which hundreds of small, light weight parts are rolled about against each other until burrs are removed and edges are rounded.

Such tumbling is still done on a large scale but, in recent years, competent engineers have tackled the job on a much more scientific basis. By trying many methods and materials, changing each of numerous variables, making use of improved equipment and tabulating and analyzing the results, tumbling

methods have been greatly improved and its field of application substantially widened.

It is still too early to say certainly and without experimentation what the best treatment shall be for a given size and shape of part made from a certain type of material to gain a particular result. There has, however, been marked progress in that direction and it appears certain that specific tumbling techniques, better described as mechanical finishing procedures, will soon be as readily predictable as the average metalworking process has become.

A few of the things that have been learned may be set down as indicative of what has been accomplished in improving tumbling methods for finishing sand castings, die castings, stampings, screw machine products and forgings, ferrous and nonferrous to name a few.

Finishing labor costs, for example, especially those involving grinding, polishing or buffing, or some combination of these, have been cut as much as 90 pct, as compared with wheel operations, with some added saving in material costs. In these cases, a greater degree of uniformity has been attained among pieces in a batch. Finish is improved over prior methods in some cases and not in others but in all, where the type of tumbling hereafter referred to as mechanical finishing has been adopted, the results meet requirements. There are cases, of course, where this type of processing has not met requirements and either has not been adopted or has been supplemented, say, by a reduced amount of wheel work.

Techniques Cut Finishing Costs · · ·

Wet processing has frequently proved faster and more economical than dry processing, but some plants find the latter adaptable to certain parts in which wet processing is not considered suitable, at least with equipment and methods that have been tried.

"Grinding" (using granite chips) should be used for deburring and grinding operations, especially on hard materials. "Britehoning" (using limestone chips) is used for wet polishing and bright honing. Steel balls or other hard and smooth bits of metal are useful for wet coloring (bringing up a high luster). Specially developed compounds supplement chips or steel burnishing media.

Best results are attained on convex surfaces. Sizable flat surfaces are not affected significantly or adequately in many cases, especially when a lustrous or brighthoned surface is wanted.

Parts will not be marred by impacts if the proper size and shape of chips are used with the proper compound and processing procedure. Excessive barrel speeds may result in separation of parts from chips with marring and other undesirable results.

Total wet processing time ranges as a rule from 2 to 8 hr, but may be more or less, depending upon many factors, such as the processing media, original condition of work, type and smoothness or finish required and hardness of the work.

Large mineral chips cut more rapidly than small ones, but do not yield so smooth a finish as do smaller chips. Other factors, however, such as the compound used, greatly influence results. In some cases, mixed sizes of chips are recommended.

Both grinding and brighthoning chips must be properly prepared and graded before they are suitable for the finishing operations dealt with here. Much the same applies to the compounds employed, that is, certain compounds are suited for use with chips for grinding and deburring, while others are used with

brighthoning chips for finishing. Before a given type and shape of part is processed on a production basis, experiments are advisable to establish the optimum treatment, including materials, equipment and methods used.

Equipment for handling chips and parts, as well as for processing, has been much improved and can be employed to advantage in reducing costs. Although the factors which have been discussed are indicative of what has been achieved by modern mechanical finishing methods, they are not the whole story. Much more can be learned by observing the methods and equipment in specific cases and these in turn are likely to suggest applications not previously con-

Modern mechanized tumbling procedures, if effectively applied, are potential sources of substantial savings in finishing costs. This article describes the latest methods used in wet and dry tumbling for buffing, deburring, polishing and honing metal parts and cites examples of savings effected at the Shakespeare Company plant in the finishing of a variety of parts.

sidered as being adaptable to the type of mechanical finishing dealt with here.

Excellent examples of effective use of modern mechanical finishing methods are found at the plant of the Shakespeare Co., Kalamazoo, Mich., where Sturgis Roto Finish equipment* and materials are employed on a large scale and for a large variety of parts made by stamping, screw machine, diecasting, wire forming and other high production processes. A representative group of such parts is shown in fig. 1. Several of these parts are for high grade fishing reels, while others are for diversified products made for automotive and other customers. As the illustration indicates, some of the products have been assembled before the mechanical finishing is performed.

Processing equipment at the Shakespeare plant includes 13 wet and 8 dry units. Dry units have wooden barrels, while wet units have wood-lined, steel barrels. All barrels are octagonal and all except those for wet

* Sturgis Products Co., Sturgis, Mich.

coloring turn about horizontal axes. As the dry processing is much slower than the wet, it is used only on parts considered too fragile for wet operations. An average run on parts done dry is about 24 hr.

FIG. 2—Arrangement of wet processing equipment at the Shakespeare plant.



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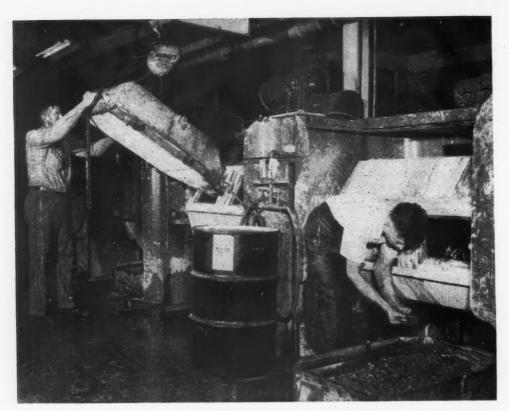


FIG. 3—Close-up of two of the newest units for wet process, one of which is being loaded with chips from the pan.

On brass, bronze, aluminum and zinc products, the average processing time for wet grinding or deburring is about 4 hr and for brighthoning is about 6 hr. Total time for wet processing steel parts, including stainless steel (which requires the longest time) ranges from 10 to 24 hr.

As the parts in this plant are seldom rough, no

grinding chips are used, all Britehoning chips being used in one of three sizes. Time probably could be shortened in some cases by using grinding chips but as the work is mostly that done best with Britehoning chips, the chance that they may become mixed with grinding chips is avoided and operations are simplified.

Fig. 2 shows most of the wet processing units arranged along an aisle and served by a light crane carrying a 1-ton trolley hoist which is used in handling charges and the Britehoning chips. The latter are placed in chute-like pans supported by swivels above their center of gravity so that tilting, to discharge the load into barrel compartments, is facilitated. This handling method is, of

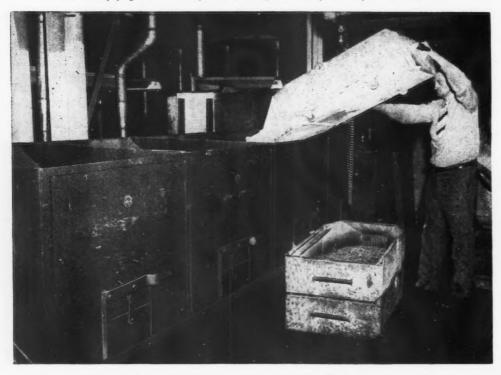
course, far superior to hand methods and, being more rapid, shortens idle time and helps to keep the machines operating.

All the processing units, except the smallest ones at the end of the aisle, have two compartments in which either duplicate lots or batches that are different can be handled as needed. The small units are

used for small lots on for batches of very small parts. Fig. 3 shows one barrel being charged and another partly unloaded with parts undergoing inspection. Unloading is done onto screens that separate chips and parts and permit thorough hose rinsing. The floor is sloped toward the drain trench which has removable grating so that the trench is easily kept free of spent abrasives and solid particles washed into the trench.

All parts processed are handled on a predetermined schedule in which the size and proportion of chips, the amount and character of Roto-Finish compound used, the speed of cylinder and other variables are definitely

FIG. 4—Emptying reclaimed chips into a storage bin. Chips are separated as to size



prescribed as a result of test runs in which the optimum conditions for gaining a given result were determined. Timers that include a warning signal are set when the unit has been charged and started, hence the operators have no excuse for failure to follow the prescribed schedules.

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After parts and chips are separated, the chips are screened to separate out smaller particles and are transferred by trolley hoist to storage bins for reuse, as shown in fig. 4. There is a bin for each size. Chips wear down gradually, the average shrinkage approximating 5 pct in 24 hr of use.

The compounds are added, according to the schedule for the part, at the beginning of a run and are washed out at the end of the run. The compound affects the

Roto-Finishing	0.210				
Saving	\$0.021	or	9	pct	
Part B, Star wheel, nickel silver, Buffing Roto-Finishing	\$2.755 0.952				
Saving		or	65	pct	
Part C, assembly of three brass part Buffing	\$2.164				
Roto-Finishing	0.247	0.38	00	net	
Saving Part D, curved brass stamping, Buffing	\$1.917 \$1.412	01	00	per	



FIG. 5—Two of the dry processing units in the Shakespeare plant. The unit to the left is being loaded, the charge including Roto - Finish chips and compound.

rate of cutting and also prevents the chips from loading or glazing in such a way as to reduce their cutting action. Chip size has to be such that the chips will not lodge or become wedged in holes but still will yield the desired finish. Larger sizes cut faster but smaller sizes yield a better finish.

Some indication as to the labor saving by Roto-Finishing, as compared with wheel buffing, can be had from the following examples of experience at the Shakespeare plant. Materials consumed, such as the wheel itself and buffing compound, when buffed, and chips plus compound, water, etc., when Roto-Finishing, are understood to cost less in each case for wet processing than for buffing; hence, the combined saving exceeds that for labor as given below. The letters identifying parts in the following tabulation refer to parts similarly lettered in fig. 1. Costs are all per 100 pieces, labor only:

Roto-Finishing	0.039
Saving	\$1.373 or 97 pct
Part E, small brass bushing with	fine inside thread,
Buffing	\$0.344
Roto-Finishing	0.013
Saving	\$0.331 or 96 pet

From these data, it may be noted that the smallest saving on the parts listed was that for part A, which has the largest flat surfaces and is made of stainless steel. Flat surfaces, though bright and adequately smooth, still show tool marks but there are no sharp edges and the outer diameter, which is well rounded, is much brighter and free of all tool marks. This bears out the statement that mechanical finishing is more effective on convex than on flat surfaces.

Dry processing is done in lighter barrels made largely from wood, as the parts are small and light and a considerable part of the charge is compound which is light and cushions impacts. A part of the charge is dry process chips to which a specified proportion of Roto-Finish compound designed for dry processing is added.

Since the total charge for dry processing is light, tote pans containing it are very easily handled, hence no hoist need be provided, especially as compartments are charged, in the average case, only once in 24 hr. Discharging is done onto screens by hand, as shown

in fig. 5.

Although wet grinding or deburring, with grinding chips, is not practiced by Shakespeare, it is an effective process and is carried out in many plants. It is employed primarily for removing burrs and tool marks, especially on steel, though usable also on nonferrous parts, including castings and forgings, and on iron or steel castings.

Most parts handled by this method range from small to medium size but quite large castings can be handled, even in the softer metals, if they are either racked or done one casting per compartment. It is necessary, however, to avoid high speed barrel rotation or other conditions that may cause the parts to be thrown about in such a way as to cause sharp impacts.

In the wet processing described in this article, the procedures are so conducted that the parts are never carried to the top of the barrel and dropped to fall on other parts, for this would result in marring. The charge actually rises only a few degrees as the barrel rotates and then slides back without any violent impacts. There is thus more of a sloshing than a tumbling action but there is relative motion between parts and the mineral chips, enabling the latter to effect a cutting or scouring action.

Actually, many parts having male or female threads, or both, are deburred without any detrimental effect, only sharp crests and edges being slightly rounded, as desired. This form of processing is, in fact, one of few effective means of removing burrs from threads. It is also useful in rounding the edges and smoothing the contour faces of gear teeth and of rounding the edges of other parts. On parts having threads or teeth, the labor savings over hand burring or even rotary brushing is unusually high and it may be almost as high on castings having numerous edges to be burred, as for aircraft work, as was repeatedly demonstrated in war work.

Time required for wet grinding or deburring varies greatly with the material burred, shape of parts, degree of roughness, type of compound, size of chips and other factors. The range is from about 10 min to 24

hr per charge.

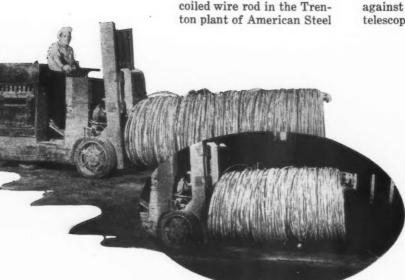
Britehoning process involving both wet polishing and wet honing, is done with limestone or Britehoning chips, and various grades of compound, as for the Shakespeare practice outlined previously. Wet polishing is generally followed by a wet honing or further smoothing action by washing out the polishing compound and applying a honing compound and continuing

the process with the same chips.

The process sometimes referred to as wet coloring is really a form of ball burnishing or its equivalent. A compound is commonly included to aid in producing luster on the parts being finished, no abrasive being present. Although the luster is not quite equal to that producible by wheel buffing or wheel coloring, it is satisfactory for many parts, including those to be plated, and, of course, requires far less labor than for buffing, particularly since the parts, which are usually quite small, are handled in bulk.

Telescoping Ram Facilitates Wire Rod Handling

A TELESCOPING ram mounted on an industrial electric truck is used to expedite the handling of coiled wire rod in the Trenton plant of American Steel



& Wire Co. The ram in the extended position, as shown in the accompanying illustration, is 9 ft long and simplifies the pick-up of stringy rod. After the load has been picked up, it is butted against a steel bumper and the load and ram telescope to 6 ft as shown in the insert. This re-

duced length facilitates the maneuvering of the truck in plant aisles. The ram is put into the extended position by engaging the ram end to a length of wire rope and backing the truck. The telescopic arrangement and the wire arrester gear were both developed at the Trenton plant.

New Equipment...

Recent developments in special purpose machine tools and deep drawing presses, centerless grinders, high pressure and direct fired heaters, and blueprinting machines are featured in this week's review. A sheet metal stiffness gage, tool post turret, small diameter tap chucks, control valves and paint spray guns are also described.

Vertical Boring Machine

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HE Holesteel vertical machine designed by National Automatic Tool Co., Richmond, Ind., for cylinder boring of replaceable sleeve liners is arranged with hydraulic feed and a fixed center gear driven head containing four spindles. Production rate is 28 parts per hour for application on a cylinder and crankcase of cast iron. The Holesteel machine illustrated is arranged to combination rough and

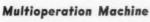
ners. Its diameter remains constant, eliminating the necessity for much

belt, therefore the contact roll, get-

ting little, if any, wear, remains

flat across and square at the cor-

truing and balancing, and its resiliency eliminates chatter. The grinder handles a variety of operations. It is adapted for through work, short pieces, 34 in. to 2 ft lengths and longer with proper supports. Diameters handled range from 3/32 to 21/4 in.



WENTY-two machining opera-L tions are performed on cast iron steering gear housings in a special automatic machine designed and built by Snyder Tool & Engineering Co., Detroit 7. Drilling, boring,



chamfering, spotfacing, reaming and tapping formerly handled on separate machines are combined in a completely automatic cycle. Work-holding fixtures are mounted

on an electrically driven, automatic, justable adaptors.

Deep Drawing Press

ESIGNED to handle high speed deep drawing of oblong shapes, a 500-ton Fastraverse sheet



metal drawing press has been built by the *Hydraulic Press* Mfg. Co., Mt. Gilead, Ohio. With platen 96 x 48 in. and bed 96 x 54 in., the press has a 42-in. stroke, with a 48-in. max opening. Three independent die cushions are provided, each with 27 x 32-in. platens and 18 in. stroke. The machine can be used for general purpose single action work with die cushions inoperative.

Surface Grinder

O setup is necessary to grind flat surface castings to within 0.001 in. in a few minutes, on the surface grinder designed for ma-

finish bore four cylinder bores to 3.781 in. diam and counterbore to 4.001 in. diam. It utilizes a jump feed to rough and finish bore lower holes to 3.719 in. diam and chamfer 15° x $\frac{1}{4}$ in. deep.

Centerless Grinder

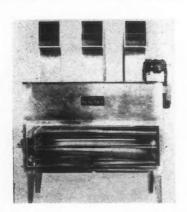
CENTERLESS wet belt grinder has been announced by the Porter-Cable Machine Co., Syracuse, N. Y. which is said to offer the advantages of quick setup, ease of operation, and capacity and popular price. An endless abrasive belt operates over a resilient contact roll. The work is done by the abrasive six-station Geneva index table, and housings are machined by five selfcontained Snyder machining units. One housing is completed every 50 sec. Parts are clamped manually. High speed steel tools cutting at 90 fpm and tungsten carbide tools cutting at 240 fpm are employed. Boring tools are flange-mounted, and drills and reamers are held in adchine shops and foundries by Peterson Welding Laboratories, 1423 Virginia, Kansas City. Castings can be ground by an unskilled operator by simply guiding the casting back and forth across the grinding wheel. Tip toe adjustment allows the operator to raise the



grinding wheel to cutting level, leaving both hands free to handle the work. A 16-in. suction fan pulls grinding dust down and deposits it in two dust collectors. Model 1A has a 14-in. stone and 3 hp motor; Model 2A is equipped with a 16-in. stone and 5 hp motor.

Fan Heater

A HIGH pressure system fan heater, announced by the Niagara Blower Co., 405 Lexington Ave., New York 17, uses a dual coil system to obtain complete utilization of both the latent and sensible heat of high pressure

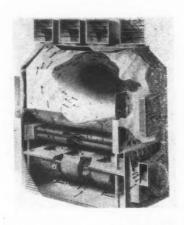


steam in heating, eliminating complex secondary piping, reducing stations and accessories. This coil system is installed in a fan heater of standard design in which air is drawn through the heater by centrifugal fans. The high pressure steam is condensed in a finned coil, the condensate flowing into a trap from which it is admitted to the regenerative vapor coil entering header where it flashes into vapor. Any remaining condensate liquid

at this point is drained directly to the final condensate return header by a tube from which this condensate gives off its heat into the air stream. From the return header the condensate is withdrawn into the return system to the boiler.

Direct Fired Heater

EVELOPMENT of a stainless steel combustion chamber for its commercial and industrial direct fired heater has been announced by the *Dravo Corp.*, Pittsburgh. Since stainless steel has such high resistance to oxidation it is claimed its application in the Counterflo heater not only will prolong its life, but will aid in maintaining high



efficiency. Refractory lining is eliminated, resulting in a lighter weight and more compact unit. Installation requires only fuel line, power line and vent stack. Heaters can be arranged to utilize either gas or oil as fuel, and can be converted readily from one to the other. In this type of heating, warm air is discharged horizontally over the floor above the workers' heads at a flow rate of about 2000 fpm. Eight different sizes have been developed, ranging from 400,000 to 2,000,000 Btu per hr. Dimensions range from 2 ft 7 in. wide x 4 ft 11 in. long x 8 ft 1 in. high for the smallest model to 4 ft 9 in x 9 ft 5 in. x 12 ft 9 in. for the largest.

Heat Exchangers

SEVEN-tube Karbate impervious graphite shell and tube heat exchangers for use under highly corrosive conditions are available from National Carbon Co., Inc., 30 E. 42nd St., New York, in three standard sizes of 4 ft 3 in., 7 ft 3 in. and 10 ft 3 in. in length. All

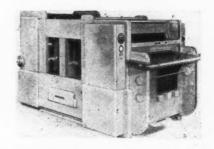
three units employ 1 in. ID x 1½ in. OD Karbate tubes in bundles encased in standard 6 in. ID steel pipe shells. The exchangers are identical in every respect except



for pipe length and the number of Karbate baffles. Units can be employed as heaters, coolers, boilers or condensers, and can be operated vertically or horizontally. They will carry temperatures up to 338°F and a working pressure of 50 psi on both the tube and shell sides.

Blueprinting Machines

OR high speed production of Bueprints, whiteprints, vandyke and blueline prints, Paragon-Revolute Corp., 77 South Ave., Rochester 4, N. Y., has developed the M4 automatic blueprinting machine, which utilizes the revolving contact principle for providing slip-free and static free contact between the tracing and sensitized material. Revolving contact is achieved through the use of a Pyrex glass cylinder, the light source remaining stationary while the cylinder revolves. The machine comes equipped with either a 75 or 95-w quartz lamp, said to be fast



in printing speed, efficient and uniform in light output. The drive mechanism provides speeds from 6 ipm to 32 fpm. Six 8-in. diam metal cylinders or drums are used for drying the prints. For processing ammonia type diazo white-prints the company has announced the Revolute A finisher. This unit features perforated stainless steel rollers, a diaphragm pump for pumping aqueous ammonia to the vaporizing tray, and an interval timer for temperature control.

Various combinations of temperature and ammonia vapor strength are available, making the machine capable, it is said, of developing all known ammonia materials on the market. The speed has been fixed at 15 fpm.

Tool Post Turret

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SETUP time and down time in general tool room lathe work is said to be virtually eliminated through the use of the tool post tur-



ret manufactured by the Crozier Machine Tool Co., 684 N. Pacific Ave., Hawthorne, Calif. Bolted firmly in place on the lathe, this tool post turret holds any four tools simultaneously, thereby doing away with resetting and recentering to tools in 90 pct of work operations, it is said. Indexing is accomplished by opening the handle and revolving the turret manually, and prelocation is determined automatically by a detent mechanism. The turret is available in small, medium and large sizes.

Cutting Fluid

A CUTTING fluid that combines essential requirements of lubrication, namely, cooling, cleaning and gentleness to the hands, has been announced by the Penetone Co., Tenafly, N. J. The product is a liquid concentrate, noninflammable and nontoxic, which is diluted with approximately 15 parts of water for use as a cutting fluid. It is said to tlean the metal as it lubricates and cools. The liquid contains no solvents, abrasives, or free alkali, it is said.

Internal Radius Tools and Blanks

DEVELOPMENT of a standard line of internal radius tools and blanks for rounding the corners of machine parts has been an-

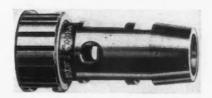
nounced by Kennametal Inc., Latrobe, Pa. They are form-ground to hold contour when reground on the top surface only. Complete tools have been designated style FR, and blanks designated style FR, and blanks designated with radii ranging from 3/32 to ½ in. in 1/32-in. steps. Grade K3H is recommended for machining corners on steel and grade K6 for machining cast iron, brass, bronze and light alloys.

Air Control Valves

OMPLETELY redesigned and now available in 79 standard models, an improved line of air control valves has been announced by the Logansport Machine Co., Logansport, Ind. Advanced sliding piston-type construction eliminates valve seats and rod packing, together with the wear and maintenance they entail. These air valves may be used in manufacturing and processing operations of all kinds, as well as for original installation in air-operated equipment. The line also offers additional types of control and mount-

Tap Chuck

DESIGNED for tapping heads and tapping machines, a small diameter tap chuck has been announced by Jacobs Mfg. Co., Hartford 1. The extreme lightness and small diameter of the chuck combine to develop less torsional inertia, it is said, reduce tap breakage particularly in bottom tapping and al-



low for quicker reversing and higher spindle speeds. The Rubber-Flex collet is made up of several hardened steel jaws permanently bonded into a synthetic rubber body which is said to be resistant to deterioration caused by heat, coolants or cutting compounds. All working surfaces of the collet are precision ground after molding and the collet is centralized by a ground conical bore in the chuck body, assuring extreme concentricity. Only

three chucks are needed to cover a range of taps extending from a No. 0 machine screw to $\frac{5}{8}$ in. hand tap.

Stiffness Gage

A PRECISION-type instrument designed to determine standard values for stiffness and resilience qualities of light sheet metal, lami-



nated plastics, paper and other thin flexible materials up to ½ in. thick, has been announced by the Taber Instrument Corp., North Tonawanda, N. Y. Sensitivity of the instrument makes possible, it is said, detecting and indicating changes in the specimen structure as they occur under load, revealing the material's elastic or spring-like qualities which can be given numerical evaluation by simple calcu-The instrument is lightweight and portable and simply requires plugging into an electrical outlet of the proper circuit required by the motor. Auxiliary weights which increase the instrument's application range from 5000 to 10,000 units stiffness are available, as well as a triple cut specimen shear for blanking out precision specimens from paper and plastic sheet up to 0.020 in. thick.

Small Crucible Furnaces

REDESIGNED multiple-unit crucible furnaces, announced by Hevi Duty Electric Co., Milwaukee 1, are used for melting small quantities of base metals, for pyrometer calibration when the couples are immersed in molten salts or metals, and for heating all materials when contained in crucibles. Maximum

safe working temperature is 1850°F, but furnaces may be operated at 1950°F for intermittent periods of short duration. Shells are formed of sheet steel fitted with asbestos heads. Two heating units consist of a helical coil of small gage nickel-chrome wire wound through the undercut grooves of a semi-cylindrical refractory. A similar line of furnaces designed for continuous operation at temperatures up to 2000°F and for ac power supply, is also available.

Spray Gun

FOR use as an internal or external mix gun in paint spraying and finishing operations, the Model DS gun manufactured by the *Electric Sprayit Co.*, Sheboygan, Wis., is equipped with an



internal fluid-break-up nozzle and tip which can be quickly replaced with an external nozzle and tip of the same type to provide a wide range of application. The external nozzle assembly, sold as an accessory, is known as the CKD conversion kit. It is said this gun permits speedier spraying of fastdrying materials with less cleaning of nozzle parts. A range of patterns from small round to wide fan may be selected without stopping the gun, which can be used either with a container or with a pressure-feed paint tank.

Light Duty C Clamps

ANNOUNCEMENT of an aluminum clamp of the C style has been made by Western Tool & Mfg. Co., Inc., Springfield, Ohio. These Champion lightweight clamps are designed to provide maximum strength at the points of greatest stress. Because of the wedge shape design, they are tough and durable

and at the same time are said to afford the advantages of maximum lightness. All sizes, with openings



ranging from $2\frac{1}{2}$ to 6 in., have sliding cross handles and heavy button tips for applying maximum holding pressure.

Sanding Pad

ACHINE sanding of curved surfaces is now possible with the Sterling 1000 portable electric sander, manufactured by Sterling Tool Products Co., 363 E. Ohio St., Chicago, 11, through the introduction of their sponge rubber pad. With this flexible pad, convex and concave surfaces may be sanded easily and uniformly, it is said. The pad, which is faced with a 1-in. thickness of an oil resistant, cellular type sponge rubber, fits all Sterling 1000 portable electric sanders and takes a $3\frac{2}{3}$ x $10\frac{1}{4}$ in. abrasive paper.

Marking Machine

FOR marking nonprecision parts, a bench machine combining the Acromark model No. 921 and a double spring precision fixture has been announced by the Acromark Co., 341 Morrell St., Elizabeth, N. J.



The new part holding fixture incorporates a slide mandrel held by a double set of adjustable springs for applying uniform pressure on irregular marking surfaces against the segment insert of the roll marking die. The machine is said to be valuable for marking such items as metal ferrules since the pressure

arrangement makes a comparatively uniform pressure on the part against the marking characters within limits of approximately 0.0312 in. and since the adjustment will allow up to ½-in. variation in the wall thickness of the part being marked.

Control Valve

H AND operated air valves designed for 175-lb working pressure with a forward, neutral and reverse position lever for better cylinder control, have been released by the *Lindberg Engineering Co.*, 2444 W. Hubbard St., Chicago. Elimination of mechanical connections between pistons which are



held in position by air pressure, and the operating lever, reduces the number of moving parts and simplifies maintenance. The three-position lever allows stopping the cylinder at any given point along the stroke. The body of the valve is made of cast aluminum and internal parts are made of stainless steel and bronze.

Replaceable Hammer Tips

REPLACEABLE hammer tips of three grades of hardness are among the outstanding features of a series of Nupla hammers introduced by the New Plastic Corp., 1017 N. Sycamore Ave., Los Angeles 38. Tips are stamped soft, medium and hard for quick selection of the exact hardness for the particular job at hand. Tips are made of a live material called Nuplaflex that is said to retain its shape under the most severe punishment. Two tips of different grades may be kept on the hammer at the same time, while a third is easily substituted simply by spinning the tips on or off. While in use, they are held firmly in place by a locking device.



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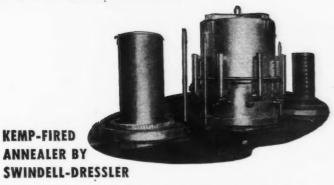
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• Strikes may hit auto suppliers' plants despite agreements by major producers... Packard output hits the million mark... "Motor Memories" an interesting new book about the industry.



ETROIT — Informal sources here believe it is immature to assume that the motor industry will not have agonizing strike pains again this year. The signing of the steelworkers wage agreement is one obstacle removed, to be sure. The Chrysler and GM-UAW pacts are another.

As observers see the auto labor situation, even if the Ford Motor Co. also agrees to a 15¢ wage boost there is at present little assurance that parts suppliers are ready to swallow a 15¢ wage "pattern." If the union insists on a 15¢ raise "across the board" it is inevitable that many suppliers' strikes will develop, thus repeating last year's rash of work stoppages. This will quickly dislocate the present even flow of materials to the auto industry.

Resistance to a 15ϕ wage boost has been made more likely by pressures being brought on suppliers, particularly by auto firms which have recently announced price cuts. Based on available information, parts producers were not told in advance that such price cuts were in the offing. However, most suppliers of the industry have since been informed by letter that they will be expected to "cooperate" in reducing prices. One result of too much pressure on suppliers could be their withdrawal from the auto

industry market rather than go along with price reductions.

In his most recent "Memo to Management," Frank Rising of Automotive & Aviation Parts Mfg. Inc. points out that prior to the steel wage agreement, there were indications that the majority of wage increases made or on the way called for 10¢ or less. "This is still true," Mr. Rising said. "Particularly in the supply companies and the small and middle-sized fabricating companies," he said, "there is a great deal of reluctance to accept the pattern theory. It is unlikely that some of our manufacturing companies can see their way clear to absorption of a lowered price for their products and also substantial hourly rate increases." Mr. Rising also said that, in his opinion, the labor bill to be passed by Congress is likely to be vetoed. "If the bill fails of passage over the veto, Congress may be all washed up for this year on labor problems," he added. Not until Congress adjourns, he asserted, will we know the real temper of the labor unions.

The temper of the UAW-CIO was pretty well demonstrated on Thursday of last week when the UAW-CIO sponsored a "Save Labor Rally" in Cadillac Square, Detroit. Approximately 175,000 workers in the auto plants left their jobs, presumably to attend the rally.

N A simple ceremony commemorating an important landmark in its 48-year history, the millionth Packard rolled off the assembly line this week. As its millionth car-a blue 1948 Super-Eight Convertible-moved off the line under its own power, George T. Christopher, president and general manager, Alvan Macauley, board chairman who joined Packard in 1910 as general manager and Ed Jones, oldest Packard employee in point of service, occupied the front seat of what Mr. Christopher described as "the first 1948 model in the industry-and America's first all-new postwar convertible."

To minimize disruption in the plant, no general announcement was made by Packard. Nevertheless, a number of workmen gathered at the end of the line to see the

blue convertible that brought Packard production to the million mark.

Standing beside the new convertible in the Packard display room was the first Packard ever built, a Packard Model A. This is a single cylinder buggy-type car loaned for the occasion by Lehigh University where it has been carefully preserved in the James Ward Packard laboratory of the Electrical and Mechanical Engineering Dept.

Equipped with shovel-handle tiller for steering, automatic spark advance, a 12 hp single cylinder horizontal motor, chain drive to the rear wheels and with three speeds forward and one reverse (through sliding and belt drive), the first Packard appeared on the streets of Warren, Ohio, on Nov. 6, 1899.

Perhaps the most startling contrast in the two cars was their respective weight. Only half as long and nearly twice as high as the latest convertible model, the first Packard weighed an astonishing 2200 lb in contrast to 4170 lb for its 1948 descendant.

AT THE time its first car was produced Packard was paying its workmen 38¢ per hr. If a 15¢ wage boost is given to Packard workers the average wage will become \$1.50 per hr.

The first Packard sold for \$1250. The latest model convertible is expected to sell for over \$3000. Mr. Christopher explained more than twice the amount of hand work goes into a convertible than goes into closed-type cars.

The latest Packard convertible features a new 145 hp engine, power-operated windows, seat and top. It has no rear fenders, the body itself extending over the wheels. The convertible also has a special, heavily reinforced X-member frame to give added stiffness that is essential to convertible models.

In a press conference following the ceremony, Mr. Christopher explained that Packard expects to reach production of 750 convertibles per month by June with initial models going to supply all Packard A and B dealers. At the present time Packard has more than 2000 dealers, he said.

It is interesting to note that Packard which makes its own en-

BULLARD 36" Man-Au-Trol Vertical Turret Lathe is setting new production records for The McNeill Machine & Engineering Co., Akron 11, Ohio. For example: a crank gear blank of welded steel - O.D. 27.166" - which formerly took 4 3/4 hours, is now bored, finished and faced complete in 22 minutes in one setup except for the crank pin bore. Another with 28.500" O.D. is done in 27 minutes. All fractional dimensions held to 1/64" .. all decimal dimensions to .005". Time based on 500 pieces, produced two months ahead of schedule.

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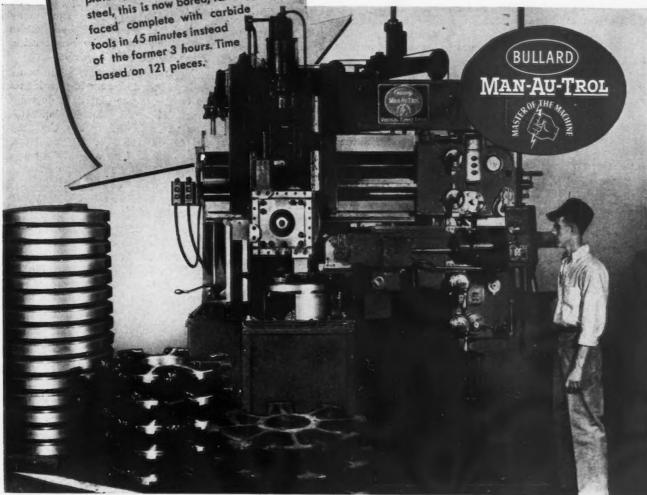
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BULLARD CREATES NEW METHODS TO MAKE MACHINES DO MORE

THE IRON AGE, May 1, 1947-75

gines, transmissions, axles and other parts for its cars, still requires the outside purchase from other sources of approximately \$600 worth of parts for each car it produces. If recent increases in wages are passed along to any appreciable extent by suppliers to car manufacturers the difficulties to be met in reducing car prices can be appreciated, Mr. Christopher pointed out.

The Packard head also explained that most parts suppliers are already producing parts for all industries — automotive, industrial power, refrigeration etc.—at near capacity rates. For this reason, he said, their ability to decrease unit costs through increased production is definitely limited.

During 1946 Packard was producing at less than half its 200,000 capacity, it was disclosed, and the earliest expectation the company has for capacity output is late 1947, barring strikes and other interruptions to production. Today the company is employing 8013 workers and at least twice the number will be required if capacity output is finally achieved.

"It took us 48 years to produce our first million cars, Mr. Christopher said, "we expect to build as many cars in the next 5 years as we did in the past 48." The outlook for steel has improved in recent months, Mr. Christopher explained. Steel suppliers are at present meeting their delivery promises approximately on schedule. Packard's steel quotas have also been raised slightly, it was revealed, although the present critical steel supply situation is expected to continue for several months at least.

In Mr. Christopher's opinion if new rolling facilities are installed as expected steel deliveries should be definitely improved by August or September. Packard expects the fourth quarter may even see steel removed from the critical list provided strikes or other economic or international factors do not interfere. The present temporary shutdown of Briggs caused by steel shortage may be reflected in Packard production schedules next week, Mr. Christopher said.

Steel is only the "closest item" on the supply list, he explained. Copper is also critical and certain specific parts, notably car heaters are short.

The hesitation of car manufacturers about producing new model cars is illustrated by Packard's experience. Faced with an uncertain supply situation, Packard was definitely apprehensive about making a general model change this year.

As a result, the decision was made to introduce only a convertible model at this time. Packard expects to introduce the closed model of its new line in September. The companion custom convertible model with 165 hp engine will also be introduced later this year.

THE latest book on the motor industry, "Motor Memories" by Eugene W. Lewis contains 312 pages of fast-moving history of the automobile industry.

The author is a successful banker, being president of Industrial National Bank, Detroit. As sales manager for Timken Roller Bearing Co. more than 50 years ago, he had personal contact with most of the pioneer car builders in their workshops, barns, and out-of-theway factories all over America.

Out of this rich experience Mr. Lewis has brought back many incidents which might easily have been unrecorded. From close personal observation he is able to write about William C. Durand, Walter P. Chrysler and many others. He devotes three chapters in his book to Henry Ford, Edsel Ford and Henry Ford II.

Mr. Lewis brings to light many interesting and amusing incidents as he traces the historical developments of the automobile industry. For example, he recalls that the Adams-Farwell Co. of Dubuque, Iowa, was making a 5 cylinder-air-cooled radial motor mounted over the rear axle in 1904 or 1905.

"That firm was 50 years ahead of its time," he said.

He recalls the early motor shows where it was customary for manufacturers to arrive with their engineers and perhaps a shop man or two. If they had prepared a new car blue print in advance they exhibited this and took orders for cars according to the print. In some instances they even waited until arrival at the show before drawing a picture of "model" they "thought" they would produce the next year.

After reading Mr. Lewis' book, one is convinced that the uncertainties that bedevil the auto industry at the present time are certainly no greater than the unpredictable conditions that were met and conquered by the pioneers of the automobile industry.

NO PICNIC: Demonstrating the temper of the labor movement in the auto city was this rally in Cadillac Square on April 24. Some 50,000 workers left their jobs in automotive plants, presumably to attend the demonstration against pending federal labor legislation.



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ictable d cone autoThe Murex Type HTS Electrode was originally developed as a hydrogen-free rod that prevented underbead cracking in the welding of high tensile plate. It is the first electrode to be successfully applied to the welding of free machining, sulphurbearing die steels. It has replaced the use of expensive stainless steel electrodes on many applications... and is being employed on a constantly increasing variety of jobs.

Have a Murex Representative put the HTS Elec trode through its paces in your shop. You may be amazed at what an excellent rod it is for your maintenance welding.



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• Lend-lease pipeline not yet emptied . . . United States receives 20 pct return on full program . . . Soviet \$233-million pipeline purchases largely industrial.



ASHINGTON — Not only Congress but industry and the taxpayers as well have been forcibly reminded that although about 21 months have passed since the end of the war, the controversial lend-lease program continues to rear its head although military shipments ceased with the surrender of Japan and all lend-lease operations theoretically ceased as of December last.

Nevertheless, the State Dept. budget for 1948 contains a request for an appropriation to enable the Office of Foreign Liquidation Commission to finish the job of clearing out the lend-lease pipeline—that is to say, to complete the delivery of goods to lend-lease countries in fulfillment of commitments negotiated since September 1945.

In his lend-lease report to Congress, covering operations from March 1941 through September 1946, the President revealed that the United States had funneled lend-lease aid to Allied countries to the tune of \$50.6 billion in round figures. This included more than \$8 billion in industrial equipment and materials of which some 25 pct was comprised of iron, steel,

aluminum, copper, and other metals and materials.

On the other hand, the report stated, the United States had received in return about \$10 billion. This consisted of \$7.8 billion in reverse lend-lease goods, \$1 billion in cash, \$1 billion in IOU's payable over a long term, and miscellaneous trading which netted the nation an additional quarter-billion.

It was also shown that the United Kingdom had been by far the heaviest recipient of lend-lease aid until the end of the war, having received about 65 pct of the total charged up to foreign governments. Soviet Russia received about 23 pct of the total. These two countries, with France and China, accounted for nearly 98 pct of all military lend-lease extended.

W HEN the atomic bomb brought a relatively sudden and unexpected end to hostilities, there was still on order or under allocation to foreign governments large amounts, totaling more than \$2 billion, of industrial and agricultural products. There was a natural reluctance to abruptly shut off supplies to the warwrecked Allies until they had a short breathing spell and a chance to get back on their feet. In addition, at that time various government departments were laboring under the belief that reconversion would result in seven or eight million unemployed in this country and that termination of the manufacture of lend-lease supplies would vastly increase the number of estimated idle workers.

As a result, the U. S. Government offered to the various lend-lease recipients the chance to buy on "reasonable" credit and payment terms the goods which they had on order as of VJ-Day. In the case of industrial materials, the term "on order" meant any item or material for which the various government procurement agencies had placed contracts with suppliers or manufacturers. Some of these items have not yet been made.

The end effect was purchase by foreign governments of about \$2.1

billion in goods which had been contracted for under lend-lease. Here again the bulk of the goods went to the same four nations as under military lend-lease: British Empire, \$442 million; China, \$694 million; France and possessions, \$392 million; and Russia, \$233 million.

Under the Lend-Lease Act, as amended by the 79th Congress, the power of the President to carry out pipeline contracts or agreements made with foreign governments prior to July 1, 1946, was further extended to permit such White House action until July 1, 1949. However, the Congress expressly prohibited use by the Treasury of any funds appropriated under the Act for the shipping of any pipeline goods after Dec. 31, 1946. Hence, the current request by the State Dept. for additional administrative lendlease funds.

N view of the billions already channeled into the lend-lease program, it is not the amount of undelivered goods that is of great importance. Virtually all of the agricultural commodities contracted for had been supplied by the beginning of 1947 when the lendlease program theoretically ceased to function and the task of completing the clearing of the pipeline was turned over to the Office of Foreign Liquidation Commissioner in the State Dept. At that time there was left to be delivered about \$25 million worth, largely in industrial items. There the figure still stands.

Included among the nations which still have deliveries due under the pipeline clearance contracts are: Russia, \$16,794,000; France, \$5,324,000; China, \$1,444,000; Austria, \$1,000,000; Belgium, \$353,000; French North Africa, \$367,000; West Africa, \$95,000; and, Saudi Arabia, \$57,000.

Categorically, the items remaining in the lend-lease pipeline are classified under two headings, (a) material now in storage and (b) material not yet delivered by suppliers or producers. About \$7.7 million is included under the first heading, most of it designated for Russia, and approximately \$17.6



Tailor-made parts manufactured in small quantities of say one to ten, and requiring several close tolerance grinding operations, afford an excellent test of the precision performance of the grinding machine. The internal broach being ground in the illustration above could very easily qualify as the daddy of all parts of this type, and each tooth is ground separately. ¶A prominent broach manufacturer chose a CINCINNATI FILMATIC Hydraulic Universal Grinding Machine for the job, because he can depend upon sizing. This is an exceptionally important consideration, for there can be no second guessing in grinding these expensive parts. Each tooth must be accurately ground with respect to the next one. ¶cincinnati FILMATIC Hydraulic Universal Grinders have many features of value in precision toolroom grinding, such as FILMATIC Grinding Wheel Spindle Bearings; Infinitely Variable Headstock Speeds; hinged Internal Grinding Attachment, and others. Would you like to know more about them? Catalogs will be sent on request.

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CINCINNATI FILMATIC 14" Hydraulic Universal Grinding Machine. Catalog G-486-4 covers the 12" machine, and catalog G-474-3 the 14", 16" and 18" machines.



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million is yet to be delivered by the suppliers.

Included in the materials held in storage is found some \$6.9 million worth of refinery equipment for Russia. According to the State Dept. this consists largely of miscellaneous component parts since large portions of the refineries have already been shipped to Russia.

"The items now held in storage would bring very small return if they have to be disposed of as surplus," the State Dept. contends. "Furthermore, it is to be expected that the government would be required to pay heavy charges in the case of cancellation of such (undelivered) contracts."

F the undelivered materials from suppliers or producers, the \$17.6 million total includes \$3,741,000 worth of mining machinery and equipment, \$1,285,000 worth of structural steel, \$567,000 worth of other industrial machinery and equipment, \$440,000 worth of machine tools, and \$43,000 worth of steel bars and sheet.

It is held by the State Dept. that no more than \$410,000 worth of the machine tools, \$310,000 worth of the industrial equipment,

and none of the mining equipment would be saleable on the domestic market except as scrap.

Inquiry by Congress brought out the information that the same holds true for most of the other stored material as well as for the undelivered (by suppliers) goods.

"It is unlikely," said the FLC, "that the unshipped material has any value other than scrap unless combined with the delivered portions. Furthermore, the oil refinery processes for which this equipment (for Russia) was built are of obsolete types from the point of view of the United States."

When the undelivered portion is broken down into similar categories as those in storage, it is found that only about \$3.3 million worth could be used in the United States, leaving some \$9.2 million classified as unsaleable in the domestic market except as scrap. The \$5 million worth of goods which have not been definitely scheduled for delivery is not classified in either category.

"Most of this material consists of items in fairly short supply," the FLC admits, "and cancellation of contracts with the suppliers would probably not result in loss to the U. S. Government."

However, what has incited the fire of some legislators is the fact that of the \$25 million worth of goods remaining in the pipeline approximately \$16.7 millions worth is tagged for the Soviet Union.

DURING the debate in the Senate prior to the passage by that body of the Greco-Turkish aid bill, it was stated repeatedly that the United States was placing itself in the somewhat incongruous position of handing out "millions of dollars to stop expansion of Russian communism" with one hand and turning over "millions of dollars for the support of Russia and Russian theories" with the other.

Under the pipeline agreement, it was emphasized, since September 1945, Russia had received about \$233 million worth of materials which with the exception of less than \$5 million for food was industrial machinery, equipment and materials—including \$40 million in machine tools, \$30 million in steam locomotives, \$3.3 million in rolling mill equipment, \$7.2 million in metalworking machinery, \$5.7 million in mining and quarrying equipment, and \$2 million in melting and heating furnaces.

Still undelivered is the \$7 million in refining equipment, \$3.7 million in mining equipment, \$2.6 million in power and electrical equipment, and \$3.4 million in miscellaneous industrial equipment and materials.

"This savors of the old pre-World War policy of furnishing scrap iron and oil to Japan prior to her entry into the war," dryly commented one senator.

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During the same period, according to figures presented on the floor, nations dominated by or under the control of the Soviet had received aid from various United States agencies such as UNRRA as follows: Poland, \$463 million; Yugoslavia, \$296 million; Czechoslovakia, \$202 million; Finland, \$92 million; and, Hungary, \$18 million.

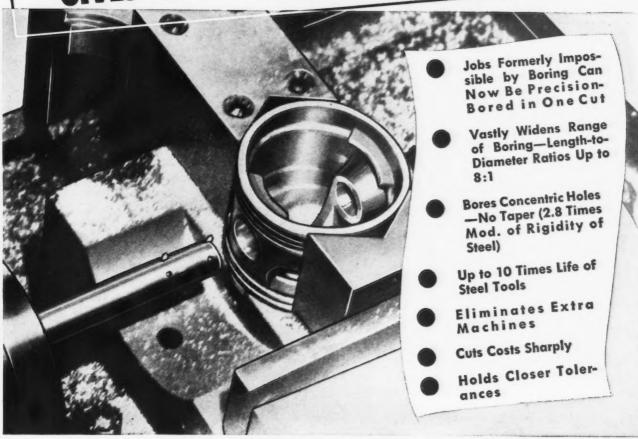
And so goes the aftermath of war. Even though the lend-lease pipeline should be cleared this year, Uncle Sam must then shift to the role of bill collector for the ensuing 30 years. Payments under the pipeline commitments will run until 1975.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Newboring bar of solid carboloy gives you these 7 advantages:



Production doubled, 13-micro inch finish obtained on aluminum piston job.

With this new Carboloy Company development you can do more jobs by boring get precision finishes in one cut—do jobs faster, cheaper. For example:

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this shift or the ander ll run An automobile company, battling poor finish on die-cast aluminum pistons, replaced steel boring bars with the new Solid Carboloy boring bar. New set-up made possible boring completely through piston in one pass (due to 2.8 times greater rigidity of Carboloy)—eliminated need for double-end machine—produced 13-micro inch finish—cut floor-to-floor time—DOUBLED production.

These new solid Carboloy boring bars and tools can produce results like these in *your* plant! Write for free folder, today.

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CARBOLOY CEMENTED CARBIDES

· Trade mourns loss of William A. Ross as it considers successor . . . Critical air speed measurements now possible . . . Kennecott Copper Corp. employees form bargaining council.



AN FRANCISCO—It is said that no man is indispensable, and perhaps the larger the organization the less the impact as one of its principals lays down his tools or closes his desk for the last time.

Probably this is true. The death last month of William A. Ross, 68, president of Columbia Steel Co., ended a career of distinction which only time can duplicate if given the same material. But the openhearths are making steel and the mills are rolling as before. Nothing is changed in this subsidiary of U.S. Steel except that perhaps most of the thousands who work there miss the warmth of Mr. Ross' personality; catch themselves up sharply as they instinctively start to dial his office phone for advice; or note the omission of his friendly memos of suggestion.

A native of this city, Mr. Ross was a westerner with interests of this area foremost in his work and life. He started his business career as an office boy in 1895 with the Washburn-Moen Mfg. Co. which soon became a part of the American Steel & Wire Co. This company's holdings were taken over by the U. S. Steel Products Co. in 1911 and Mr. Ross was appointed assistant treasurer. After holding several executive positions with this company he was selected as vice-president and treasurer of the Columbia Steel Co.-the old Columbia Steel Corp. which had been acquired by the U.S. Steel Corp. in 1930. In 1932 he was appointed vice-president and general manager of sales and in September 1939 he was elected to the presidency of the company.

While officials of U.S. Steel are noncommittal on a successor to Mr. Ross, the steel trade is less taciturn and several names have been suggested as "certain," "probable," or "positive," new presidents.

There is a strong feeling among some of Columbia's best customers that the post should definitely go to a westerner and preferably a man already well established in the company. In fact, some of these businessmen have already made their recommendations to corporation directors.

Rumor persists that no president will be named by the board of directors for at least 6 months during which time an eastern official will take over the reins while the Pittsburgh expansion is completed and the purchase of Consolidated Steel Corp. either consummated or dropped.

Possibility of a company outsider getting the post at this time is discounted by informed sources who point out that there is capable executive material already in the company and that other western steel men of presidential caliber are probably beyond reach because of legal complications or commit-

The steel trade had other things to talk about last week when the AFL Molders & Foundry Workers Union struck five plants putting approximately 400 men out of work and threatening to close 75 foundries in the area which employ approximately 5000.

Negotiations had progressed well at week's end and indications were that some settlement of the union's demand for a 10 pct increase would be arrived at.

Efforts are still being made to avoid a strike on May 15 of approximately 22,000 Bay Area machinists who are demanding wage increases of from 25 to 27 pct. Federal Conciliator Andrew Gallagher is seeking to bring about a settle-

OS ANGELES - Experiments conducted at Lockheed Aircraft over a long period of time have resulted in a solution to the problem of accurate instrument reading in the critical speed ranges between 700 and 800 mph in wind tunnel tests, according to Ward Beman, chief aeronautical research engineer, and John H. Weaver, wind tunnel manager.

Their invention is known as a "rounded aluminum bump." It is a 500 lb riveted aluminum baffle. 11 ft long, 12 ft wide and 2 ft thick at its thickest point. When this "bump" is installed on the wind tunnel floor, it creates a curved instead of a straight flow of air. Built like the wing of an airplane, the baffle will withstand up to 40,000 lb of air pressure.

When the first miniature scale model designed by Beman and Weaver proved successful in testing, the program was moved to the Cooperative Wind Tunnel at the California Institute of Technology, a cooperative enterprise owned and operated by the four leading Southern California airframe manufacturers.

"One of the great barriers to further advances in aviation," Ward Beman said, "has lain in our inability to obtain accurate instrument test readings in the 750-to-800 mph range—the mysterious speedof-sound segment. Certain changes in air flow take place upon airplane structures, which is the phenomenon we call 'compressibility.' Our goal has been to find some method to make scientific, dependable speed measurements within this range."

First tests recently at California Institute of Technology, in the new 12,000 hp tunnel, gave readings of 850 mph, or a Mach Number of 1.1. Almost all standard wind tunnels may be converted for testing through the sonic and supersonic ranges by the installation of the Beman-Weaver "bump." This will have great practical significance for the airframe industry, for now wing sections or whole structures may be pre-tested for use with jet



The Machine Pays for Itself! Briquettes produced with a Milwaukee Hydraulic Briquetting Press act like solid blocks of metal of identical size and weight. They melt readily, with practically no loss whatsoever. Aside from serving as a conservation measure, the briquetting process pays for itself in the greater amount of scrap metal salvaged from borings and turnings in the plant. Also of importance is the space and labor

saving factor . . . the tremendous bulk of borings and turnings is reduced by briquetting to a uniform and convenient size for handling readily and without breakage.

Check Your Tonnage! Why not check your annual tonnage of metal borings and turnings to determine the possibility of salvaging it economically. Milwaukee engineers will gladly make available to you, for the asking, a vast store of knowledge and experience in solving your chip reclamation problems. Write today for Bulletin 117 giving complete details.

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MILWAUKEE 4, WISCONSIN, U.S.A.

and rocket motors. When flight test pilots take advanced supersonic aircraft aloft for first flights, they will know what to expect, based on accurate wind tunnel testing, according to Lockheed officials.

North American Aviation, Inc., suspended production of its Navion, four-place light plane, for 30 days. A survey of future business is in progress to determine new production rates. Until the suspension, production was at the rate of 10 a day, and the company had manufactured 1000.

AST of a man-made mountain of aluminum scrap, accumulated at Camp Haan, near Riverside, Calif., was sold on May 1, when the Los Angeles regional office of War Assets Administration opened bids on 2,500,000 lb of the metal, according to R. N. Olson, chief of the Metals Division of that office.

The May 1 bid opening puts back into trade channels the last of more than 41 million lb of scrap salvaged from hundreds of crashed and worn out warplanes, and scrap from plant production lines. Accumulated since the end of hostilities, the huge pile was 40 ft high and nearly a mile long. Previous sales conducted during the past year disposed of all but the 2,500,000 lb now up for sale.

Disposal of the final lots, to be sold "as is," the buyer guaranteeing to accept all of a lot regardless of its final weighed poundage, will clear the depot of scrap and permit deactivation of that section of the huge camp site.

Los Angeles aluminum scrap sales, among the largest in the nation, have been but one phase of that region's contribution to a nationwide drive by WAA to channel strategic materials back into commercial uses as quickly as possible. The Los Angeles WAA region has also disposed of large stocks of copper, lead, tin and zinc, which formed part of a national program credited with returning more than \$33 million worth of those metals to postwar production.

SALT LAKE CITY—In line with the International Union of Mine, Mill & Smelter Workers' shift from area to company-wide bargaining, a Kennecott Copper Corp. council was formally organized last week and non-salaried officers, elected. The council will represent some 18,000 Kennecott employees in Utah, Arizona, Nevada and New Mexico. It is made up of representatives of the CIO, AFL and some independent unions, with the CIO predominating.

Contracts at the Utah properties are reopenable on wages only between June 12 and 30.

The International Union of Mine, Mill & Smelter Workers set its wage increase goal at 25¢ per hr some time ago. The new Kennecott council has not publicly announced what its demands will be, but in view of the settlements in steel and other industries, the expectation is that the 25¢ mark will be scaled downward.

One hundred and thirty employees of the Bingham & Garfield railroad (Kennecott subsidiary which transports ore from the copper mine at Bingham to the Manga and Arthur mills) threatened to tie up the Utah division of the corporation before 4000 to 5000 mine and mill workers even started negotiating for wage increases. The railroad employees (represented by the ORC and BLF&E) called a strike for Apr. 24 but postponed the walkout when the railroad mediation board stepped in at the last minute with an offer to mediate the dispute.

This controversy arose not from wage demands but from the threatened change in the status of the railroad workers when Kennecott completes its new railroad from the mine to the mills and abandons the Bingham & Garfield line. The new line, about half completed and scheduled to be put into operation late this year or early next year, is regarded by the company as industrial trackage rather than as a common carrier. The railroaders are seeking to extract a guarantee in advance that they will continue as railroad employees with railroad retirement act rights. The same issue arose in 1943 with Bingham & Garfield and with the employees winning their point in the U. S. District Court.

Had the railroaders pulled their threatened strike they would have idled 5000 mine, mill and smelter employees in an effort to win for the 130. advantages not enjoyed by the 5000. And they would have reduced to impotency any strike club the 5000 might want to use in their negotiations for wage increases.

Kennecott's Utah division is currently producing about 25 pct of the domestic copper output.

SEATTLE—As the \$2 million passenger and automobile ferry Chinook was launched two weeks ago at Plant A of the Todd Shipbuilding Corp. on Harbor Island, a period of feverish shipbuilding avtivity was ended both figuratively and literally.

According to R. J. Lamont, president of Todd-Pacific, prospects for new ship construction are, "not promising." The yard has recently been employing approximately 600 persons in comparison to the thousands working there during the war when the yard built destroyers. "Right now," Mr. Lamont said, "the ferry we are building for Puget Sound Navigation Co. looks like the conclusion of a shipbuilding program in this area. There seems to be little likelihood of any immediate private construction and the government shipbuilding possibilities are still up in the air.

Approximately 6 weeks' work remains on the deluxe ferry.

Northwest Steel Rolling Mills is calculating the increase in production costs brought about by the recent increases granted industry workers and anticipate that in all probability it will amount to approximately \$2.50 per ton of metal.

Lower prices for scrap apparently are not developing to help offset the increases in labor costs, although there is one bright side to the picture in that for the first time in several months it was not necessary to cut into scrap inventory to keep the furnaces full. Grade remains low and some trouble has been experienced in maintaining ingot supplies to operate the rolling mills at capacity.

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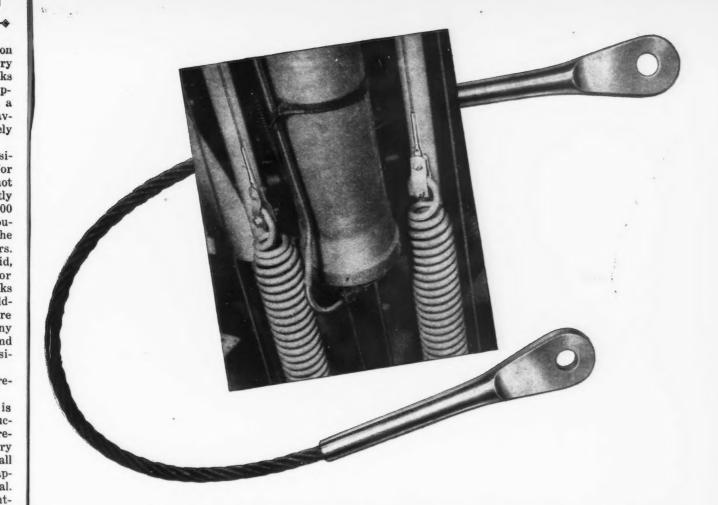
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Employment at New High

Buffalo

• • • Employment and average weekly payrolls of 173 area plants climbed to new peacetime high levels in March, according to a report by the Buffalo Chamber of Commerce. Factory employment rose to 89,131 in the month from 88,653 in February. The March level was 25.1 pct above the 71,253 reported in the same month of 1946. Average weekly payrolls increased to \$4,637,330 from \$4,544,-157 in the preceding month and compared with \$3,290,446 in March 1946. Average weekly earnings of workers in the 173 plants were \$52.03 in March, \$51.26 in February and \$46.18 in March 1946.



Does this cold-swaged cable fitting give you an idea?

It took a lot of experimenting before engineers found the right combination of "physicals" for these rugged aircraft-cable terminals.

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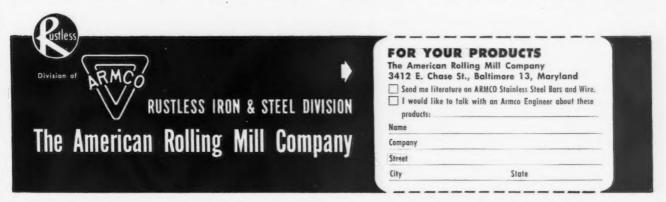
This answer came up: Special-analysis ARMCO Stainless Steel bars. Here the swaged cable fittings are shown attached to springs in the hydraulic landing gear mechanism of a DC-6—two of the 50 or more cable ends in the new Mainliner 300 of United Air Lines. Many other planes are equipped with cable ends like these for controls operated from the cockpit.

The job calls for corrosion resistant stainless steel of great strength, good ductility, and high machinability. It

must withstand the drilling of a hole through the length of the bar, and "take" the bear-hug of a cold-swaging operation without cracking.

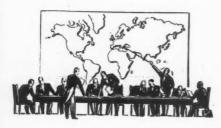
ARMCO 18-8 FM, Type 303 bars filled the bill completely. Barrels of cable turnbuckles and sleeves are machined from ARMCO 17 FM hexagons, Type 430F.

Finding the right stainless steel here is another example of the way Armco engineers work with designers of equipment. If this sparks an idea for you, fill in and mail the coupon at the bottom of this page. Just address Rustless Division, The American Rolling Mill Company, 3412 E. Chase Street, Baltimore 13, Maryland.



European Letter . . . JACK R. HIGHT

• Bill nationalizing British steel industry may be presented in the spring of 1948... Present indications are that acquisition would be made on basis of market value.



Zation issue for Britain, although we have not mentioned it for some weeks, is by no means a dormant issue. As reported previously, (see The Iron AGE, Sept. 26, 1946, p. 96) the Iron and Steel Board was appointed by the Minister of Supply to supervise the industry, and the industry agreed to membership on the board only on the condition that the nationalization issue would not be a part of the duties of the board.

The Minister, therefore, made it a special function of one of his undersecretaries to study the nationalization issue. He has now presented a memo to the Cabinet on that issue. The memo has been before the Cabinet probably since the second week in January, and will need to be approved in principle or perhaps disapproved in certain parts by the Cabinet to permit the Ministry to go forward with the preparation of a bill which will authorize the government to actually set up a government corporation and nationalize the industry.

The "enabling bill" will be a detailed, very complicated act and several months will be required for it to be properly prepared. Inasmuch as the Cabinet will consider in about September which bills are to be included in the legislative program for the next session, it seems

clear that unless the Cabinet makes a decision in the near future there is little possibility that a steel nationalization bill can be presented to the autumn session.

Barring presentation in the autumn session, the matter would be postponed until the spring of 1948. Presumably if an enabling bill were passed in the spring of 1948 a "vesting" date, when the government would actually take over, might be set for Jan. 1, 1949. However, this date is getting conspicuously close to the date of the next general election in Britain, and so, pushed forward until that time, the issue becomes increasingly pregnant politically.

At the moment there is at least a 50-50 chance that the enabling bill will not find its way into the autumn 1947 session, as one of the reasons why the Cabinet decision has been deferred may be the existence of a difference of opinion within the Cabinet as to the wisdom of going forward with the program at the present time. The basic difference of opinion is between those members who believe in nationalization for its own sake, and a rather strange mixture of persons on the other side of the fence who are not sure that it is a good idea fundamentally. More importantly, there is a group that feels sure that the present government has about as much in its craw as it can stand.

HE government idea at the moment is that the shares of the principal sections of the industry should be acquired by the government on the basis of market value. This method of valuation is not considered to be eminently fair, but is considered more practicable than any other system. Other possibilities considered were the valuation of the assets of the various firms such as is being done in the case of the coal mines, but although such a system would probably be more fair in all respects, the drawback here is that the very small group of capable valuers in the United Kingdom will be tied up for years on the coal valuations alone. A similar job on the steel industry would consume even more years bringing it into effect even if the people were available to do the work, which they are not.

The eminently unfair aspect of acquiring on the basis of market value is inherent in the fact that those companies who have followed a too liberal dividend policy perhaps at the expense of their mills, and therefore have acquired a favorable following in the stock market in the City of London, will benefit more than other companies which may have been more conservative with respect to dividends and followed a more enlightened long-term policy with respect to mill equipment.

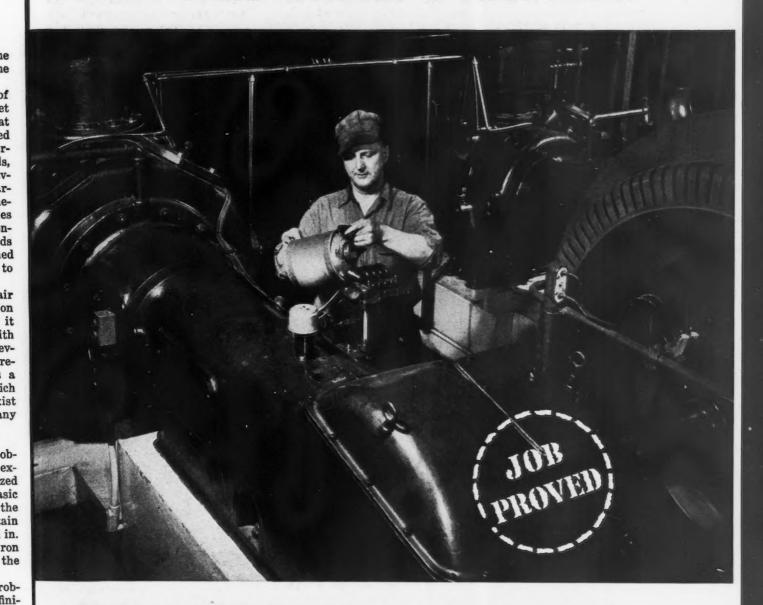
Despite the obviously unfair aspects of the market valuation system, the government will, if it chooses, decide to go ahead with this method as the lesser of several possible evils. It must be remembered that there is always a fringe of the Socialist party which adheres to the traditional Marxist idea of no compensation of any form.

ONE of the most difficult problems is a definition of exactly what should be nationalized and what should not. Once a basic decision is made to nationalize the steel industry there are certain sections which automatically fall in. The beginnings will be the iron ore and pig iron properties and the steel melting industry.

Where the most serious problems begin to occur is in the definition of exactly what in the steel finishing end shall be included inside the chalk line and what shall be excluded. Although it may not receive Cabinet approval, the present ideas of the Ministry are that all of those obviously integrated hot-finishing operations should be nationalized, that is the structural industry, hot strip mills, hot tube mills, and similar lines.

On the other hand cold-drawn tubes and wire may quite possibly not come within the scope of the nationalization program. The idea here is that in the case of the wire industry, if the wire rod production is nationalized, the government will have an adequate control of the wire industry itself from the stand-

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point that it will control 100 pct of the raw materials for the wire industry itself.

The primary idea in all of the Socialist measures is to give the government a strong enough control of the sources of supply that all subsequent operations may be adequately planned by the government for the good of all. Thus, for the purposes of the present Labor Government in Britain, it is fundamentally no more important to nationalize the wire drawing industry than the automobile industry, although technically speaking the former is within the scope of the election promise and the later is not.

A NOTHER possible source of difficulty will be in the acquisition of iron ore properties in-asmuch as many of the British steel firms own ore properties scattered

practically all over the world. Thus in the case of concert ore, it is one matter for a private British corporation to own the "rights" mine the properties in Spain, but quite another for the British Government to acquire even business "sovereignty" over a part of another sovereign power. There is probably some perfectly clear answer to this particular problem, but it seems likely that at the moment the Ministry has approached it simply as one of those things that we will have to worry about tomorrow.

In the case of the independent rerollers, which always represent an important minority in the case of the British industry, the policy will be along the same general lines. The government will take over the larger, more important firms, while the smaller organizations will be left outside. There are important government officials who feel that the existence of smaller independents will serve to keep up the pace in the government corporation and will be worth having if for no other purpose.

The British Industries Fair, to be held in London and Birmingham from May 5 to 16, promises to be one of the best ever. Already promised for display are the keys to British aircraft gas turbine success, Nimonic 75 and 80. The Board of Trade promises that British engineers are making marked progress with experimental gas turbine ships and locomotives.

The "very latest in rustless violin strings" will also be exhibited. Stainless steel with a reputed strength of 160 tons per sq in. is used as a covering for the wound strings. The fair this year is expected to attract more than 350,000 visitors.

Polish-Swedish Agreement

• • • The new Polish-Swedish Trade and Financial Agreement covering the period April 1, 1947, to March 31, 1948, provides for the mutual exchange of goods to the value of Kr. 302,000,000 (\$83.4 million). Polish exports include 3 million tons of coal, coke, zinc, chemicals, machinery, and Swedish exports iron ore, machinery, instruments and installations, ball bearings, prefabricated houses.

An additional agreement, valid for 4 years, has also been signed whereby Sweden will participate in the reconstruction of Poland in return for supplies of Polish coal. Orders placed in Sweden will mainly cover material included in the Polish Three-Year Plan of economic reconstruction.

French Second Quarter Steel at 1.5 Million Tons

Paris

• • • France's total tonnage of steel available for the second quarter of this year, including 55,000 tons imports, has been estimated at 1.5 million tons, whereas the total demand is estimated at 3 million tons. The tonnage available has been reduced by 82,000 tons on first quarter allocations and by 161,000 tons on the tonnage allocated during the last

quarter of 1946. This reflects the decrease in production during the first quarter and the reconstitution of stocks that had been depleted in order to meet the allocation program last quarter.

It is estimated, however, that 80 pct of the program for covering North African needs and of the Monnet Plan will be realized. For the production of electrical equipment, 94 pct of the steel needed will be allocated. This has been achieved by reducing the allocations to the dockyards, national defense and rebuilding.

British Unemployed Drop

London

• • • In Britain 761,257 persons were registered as unemployed on March 10 last, which is a drop of 1,109,066 since Feb. 22 when the fuel crisis was at its height.

At the same time there has been a further decrease of 19,600 in the estimated number of workers stood off who had not claimed unemployment benefit, making the total decrease since Feb. 22, 479,200. The combined figure thus shows a drop of 1.588,300.

In the regions which were affected by the power switch-off the total drop in unemployment between Feb. 22 and Mar. 10 (including the numbers not claiming benefit) is estimated at 1,560,000, or 73 pct of the Feb. 22 figure.

Sets Up Atomic Research

London

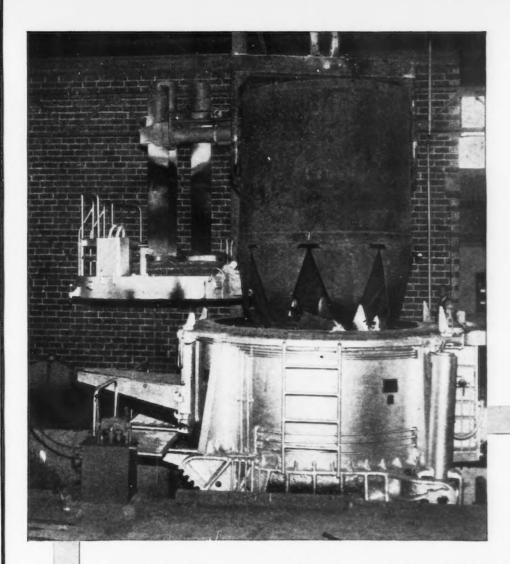
• • • • The Australian Government has established a new scientific agency for atomic research, following recent consultations with the British nuclear physicist, Prof. Oliphant. Five nuclear scientists are being appointed, and Prof. Oliphant may decide to return to Australia as their head.

It was recently announced in Melbourne that the Federal Government, in collaboration with State Governments, has "secretly organized vast plans to discover new fields of uranium and other radioactive minerals suitable for the production of atomic energy."

French Welfare Cost High

• • • France's social security program will cost 91 billion francs (\$758 million) for accident, disease, maternity and old age pensions, and 37 billion francs (\$308 million) for the extension of old age pensions this year. This brings the total to 128 billion francs (\$1060 million), plus 48 billion francs (\$400 million) for family allowances.

Cost of these compulsory social charges for employers will amount to 36 pct of the workers' wages. The workers themselves will contribute 10 pct of their pay.



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INCREASED TONNAGE with TOP CHARGING

Your tonnage per man-hour will show a marked increase with Lectromelt furnaces. The top charge feature of Lectromelt means more heats per turn, less dead time for men and equipment. Actual tests have proved that Lectromelt's top charging provides substantial money savings. Write for full details.



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MANUFACTURED IN

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- Ernest R. Bear has been elected vice-president in charge of the Philadelphia office of the Turner Construction Co. to succeed H. C. Turner, Jr., who was recently elected president of the company.
- John J. Prohaska, general sales manager of the Cleveland Automatic Machine Co., Cincinnati, has been elected vice-president of the company. He will continue to direct the company's sales activities as general sales manager. Also elected vice-presidents were Nicholas Peay, former assistant to the president, and Richard E. Le-Blond, president of the R. K. Le-Blond Machine Tool Co. Frank Stenger, former assistant secretary, was elected secretary and assistant treasurer.
- Howard M. Dirks has been elected vice-president and personnel director of Carrier Corp., Syracuse, N. Y. He has resigned his position as director of industrial relations of the Perfect Circle Corp. of Hagerstown, Ind., in order to take up his duties in Syracuse on May 1.
- Brison Wood has been elected treasurer of the Minneapolis-Honeywell Regulator Co., Minneapolis, succeeding Willard L. Huff, who has been serving as executive vice-president and treasurer. Mr. Huff will continue to serve as a director of the company and executive vice-president. Joining Minneapolis-Honeywell in 1942 to assist in expediting war production, Mr. Wood was elected assistant secretary and assistant treasurer the following year, which positions he has held until his election to treasurer.
- •Kenneth D. Bryan has been appointed general superintendent, and W. Rex Reiter, assistant general superintendent of the Braeburn Alloy Steel Corp., Braeburn, Pa.
- H. Waldemar Koehn, former president of the Sike Co., has joined the Barcalo Mfg. Co. of Buffalo as technical consultant.
- Charles G. Purnell recently rejoined Carnegie Illinois Steel Corp., U. S. Steel subsidiary, as development representative in the market development division. He previously served as a metallurgical contact representative.

PERSONALS

• James B. Jamison has been named president of the Standard Steel Specialty Co., Beaver Falls, Pa., to succeed the late Ernest J. Wagner. Mr. Jamison has been with the company since its organization, first as secretary and sales manager and in more recent years he has been vice-president and director of sales.



F. GARVIN SMITH, president, A. C. Leslie & Co. Ltd.

- F. Garvin Smith has been elected president of A. C. Leslie & Co. Ltd., Montreal, Canada, succeeding William S. Leslie, who has been elected chairman of the board. Mr. Leslie had been president of the company for over 40 years. Mr. Smith has been a director of the company for many years.
- · Bernard H. Lord, former Chicago district sales engineer of the Ceco Steel Products Corp., has been appointed district manager of Ceco's New Orleans office. Walter E. Lord has been named district manager of the Milwaukee office. Mr. Lord was formerly associated for 27 years with the Concrete Steel Co. of Minneapolis. He replaces W. O. Richards, who has been promoted to the post of assistant manager of the Chicago district office. Lester R. Wise has been named manager of the Chicago district office of Ceco's merchant trade division.

• S. Horace Disston, with 48 years of service with Henry Disston & Sons, Inc., Philadelphia, the past 8 years of which he was president, has been advanced to the office of chairman of the board. Jacob S. Disston, Jr., who has been a vice-president of the company for 14 years, advances to the office of president.

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- Thomas A. Brown has been appointed division superintendent, secondary mills, of the Youngstown. Ohio district works of Carnegie-Illinois Steel Corp. Mr. Brown has been with Carnegie-Illinois since 1931 and was in the company's Pittsburgh office before his appointment as superintendent of industrial relations for the Youngstown district in 1940. Later he was appointed assistant to the general superintendent, and in 1944 became assistant division superintendent, secondary mills, the position he held until his current promotion.
- C. R. Powers has been appointed procurement and engineering manager of the Dearborn Motors Corp., Detroit. He will direct procurement and engineering of the complete line of farm implements which Dearborn Motors will distribute with the Ford tractor after June 30. Prior to joining the firm of George W. Walker, Mr. Powers was general manager of Harry Ferguson, Ltd., in charge of English operations at Coventry.
- W. H. Brown, assistant general manager of Hoskins Mfg. Co., Detroit, has been named a director of the company and W. A. Gatward and A. B. Tilton, chief engineer and purchasing agent, respectively, have been made vice-presidents of the company.
- R. M. Moore has been appointed general sales manager of Pittsburgh Coke & Chemical Co., Pittsburgh. Mr. Moore has been associated with the company for several years actively in charge of the activated carbon program, as well as assisting in other operations of the company. Alan S. Evans has been appointed manager of the chemical sales division of Pittsburgh Coke & Chemical Co. Mr. Evans also has been associated with the company for several years, spending all of his time in chemical sales, research, and promotion.

- Frederick G. Hughes, vicepresident of General Motors Corp. and general manager of its New Departure Div. at Bristol, Conn., has retired after 36 years of association with New Departure. He will be succeeded as general manager by Milton L. Gearing, who has been plant manager for New Departure at Meriden, Conn., for 15 years. He also is a veteran in the division, having joined New Departure in 1923. Mr. Hughes has been a top executive of New Departure since 1911, when he started at the headquarters plant in the post of chief engineer. He became assistant general manager in 1914. He was named general manager in 1933, when New Departure became a division of General Motors, and was elected a vice-president of the corporation in January 1947.
- Henry S. Elder has been named vice-president of Titeflex, Inc., Newark, N. J. Prior to joining the Titeflex organization, Mr. Elder was assistant treasurer and a director of National Fireworks, Inc. He has also been secretary-treasurer and a director of the Boltan Mfg. Co., and secretary-treasurer and director of the Seaboard Commercial Corp.
- W. N. Foster, divisional district representative, Caterpillar Tractor Co., Peoria, Ill., has been promoted to assistant manager of the eastern sales division of the company. Mr. Foster is relieving C. A. Barabe, present eastern division sales manager, who will start a 6 months' leave of absence June 15. Mr. Foster joined Caterpillar in 1934 and has served in the engine sales, merchandise and purchasing departments, before becoming a district representative in 1944.
- Glenn W. Malme, formerly advertising manager for Southern California plants of Western Gear Works, has been advanced to the position of sales promotion manager for all three plants of Western Gear Works and Pacific Gear & Tool Works. Mr. Malme has been with Western Gear for the past 5 years and now will handle all advertising and sales promotion activities for the three plants. He will retain his offices in Los Angeles.



ISAAC HARTER, chairman of the board, Babcock & Wilcox Tube Co.

- Isaac Harter has been elected chairman of the board of the Babcock & Wilcox Tube Co., Beaver Falls, Pa. Accordingly, he has retired from his position as vicepresident and director of the Babcock & Wilcox Co. Mr. Harter joined the Babcock & Wilcox Co. in 1907. He was superintendent of its Barberton, Ohio works; superintendent of its Bayonne, N. J. works, and assistant to the president. He has been a vice-president and director of the Babcock & Wilcox Co. since 1924, and has served as executive vice-president and director of the Tube Co. With the election of Mr. Harter to the chairmanship of the Tube company board, P. D. White becomes executive vice-president of the company. He has also been elected a member of the board of directors. George J. Hartnett, Sr. has been made general superintendent of the Babcock & Wilcox Co. with headquarters at the Barberton works. C. H. Gay advanced from assistant superintendent to superintendent, and George J. Hartnett, Jr. became assistant superintendent.
- Joseph Pfeisfer has been appointed director of purchases for Chrysler Corp., Detroit, succeeding A. P. Hascall. Mr. Pfeisfer has been associated with Chrysler Corp. and its predecessor, the Maxwell Co., for more than 30 years. He was appointed general purchasing agent for Chrysler in 1945.

- Thomas P. Wagner has been named president and treasurer of the Superior Drawn Steel Co., Monaca, Pa.
- Shirl M. Rudolph has been named vice-president in charge of sales of the Hays Corp., Michigan City, Ind. William H. Pugsley has been appointed vice-president in charge of field research of the company. Mr. Rudolph has been associated with the company since 1920, Mr. Pugsley since 1932.
- Walter L. Edel has been promoted to vice-president in charge of engineering and research of the Clayton & Lambert Mfg. Co., Louisville, Ky., and Middletown, Ohio. Mr. Edel joined Clayton & Lambert in 1943.
- Joseph H. Horter, Jr., has been named manager of the business management department of Hudson Motor Car Co., Detroit, succeeding R. N. Hamilton, Jr., who will remain with the company on special assignments.
- R. E. Reider has been appointed service manager of the refrigeration division at the Reynolds Metals Co., Louisville. Prior to joining Reynolds, Mr. Reider was with the Norge Div. of the Borg-Warner Corp. for 14½ years as assistant to general office manager, manager of the service parts order department, and finally as assistant national service manager.
- E. A. Erickson has been appointed shop superintendent and Myron G. Caylor, office manager of the new Hornell plant of SKF Industries, Inc., Philadelphia. They will be transferred to Hornell for the start of operations scheduled to begin about July 1. Other supervisory employees will be William Harrington, planning and stores; Harry R. Fillmore, general foreman; Gustave Peterson, foreman for milling, drill press and semi-automatic machines; Edward J. Burbank, foreman for finishing, inspection and assembly; Albert Herlinger, foreman for turret and engine lathes; Herman Atkins, foreman for boring mills; William Tonkin, night foreman, and J. C. Owens, supervisor of estimating, time study and methods.

- Dr. Robert A. Ruehrwein has been promoted to research group leader, central research department, Monsanto Chemical Co., St. Louis. Dr. Ruehrwein will be in charge of the physical chemistry research group. He joined Monsanto in 1943.
- R. C. Cosgrove, general manager of the Crosley Div. and vice-president in charge of sales of the Avco Mfg. Corp., Cincinnati, has been elected to the board of directors. James D. Shouse, formerly a vicepresident of the Crosley Corp., who is now president and a director of the corporation's whollyowned subsidiary, Crosley Broadcasting Corp., has also been elected to the board. Other new directors are Carl H. Kindl, vicepresident in charge of manufacturing; J. H. Oppenheim, vicepresident and general manager of the new idea division; and Harry Woodhead, president of Consolidated Vultee Aircraft Corp., an associated company.
- Owen B. Olson has been appointed sales engineer in the Chicago district for Hyatt Bearings Div., General Motors Corp. He served a short time in the production engineering department of Wallace & Tiernan Co.



RICHARD F. V. STANTON, vicepresident, Pratt & Whitney, division Niles-Bement-Pond Co.

- Richard F. V. Stanton has been elected vice-president, continuing in his present capacity of assistant machine tool sales manager of Pratt & Whitney, division Niles Bement Pond Co., West Hartford, Conn. He began with Pratt & Whitney 30 years ago as supervisor of gage design in the ammunition equipment engineering department.
- · William P. Drake, manager of sales of the special chemicals division of the Pennsylvania Salt Mfg. Co., Philadelphia, has been appointed assistant vice-president. Edwin M. Ott, chemical engineer in the market research department of the Pennsylvania Salt Mfg. Co., has been named assistant manager of market research, and Arthur F. Bixby, heavy chemicals salesman in the Philadelphia office of the company for the past 9 years, has been transferred to the Pittsburgh office. Mr. Bixby takes the place of C. W. Dermitt, who has been transferred to Cincinnati to become district sales manager.
- John Golemgeske has been appointed manager of the new Milwaukee office of James Flett Organization, Inc.
- Harold Myers has joined the Perfect Circle Corp. as a member of the central staff at Hagerstown, Ind. He will be associated with the chief engineer of the manufacturing division.
- George Hohmann has been promoted to Chicago district manager of the electrode division of the McKay Co. He joined the company in 1942.

- Fred A. Hanlin, 58, vice-president of Weirton Steel Co., Weirton, W. Va., and a director of the National Assn. of Manufacturers, died Apr. 19.
- Edwin B. Peet, 64, sales manager for the Cameron Can Machinery Co., Chicago, a whollyowned subsidiary of Continental Can Co., died Apr. 4, following a long illness.
- Lester A. Moehring, 55, comptroller of the Chrysler Corp., Detroit, for the last 20 years, died Apr. 11.
- A. G. Ladrach, president of the Magnetic Gauge Co., Akron Ohio, died Apr. 8.
- Milton R. Sheen, 63, president and cofounder of the Milton Roy Co., Philadelphia, died recently.
- Thomas J. Boyd, for the past 12 years an auditor for Ford Motor Co., Dearborn, Mich., died Apr. 13.

..OBITUARY...

- Edwin S. Thompson, assistant manager of sales promotion of the Chevrolet Div. of General Motors Corp., Detroit, died Apr. 14.
- John A. Schwert, 59, general foreman of the masonry department at the Lackawanna, N. Y. plant of the Bethlehem Steel Co., died Apr. 15. He had been employed at the plant 40 years.
- Andrew H. Green, Jr., 81, formerly manager of the Solvay Co., Detroit, died recently.
- Thomas J. Fitzsimmons, 79, president of the Kitts Steam Specialty Co., Oswego, N. Y., died Apr. 15.
- Raymond E. Foster, 54, employment manager for 21 years at the American Laundry Machinery Co., Rochester, N. Y., died Apr. 22.

- Charles Kretschman, 78, former treasurer of the American-La-France-Foamite Corp., Elmira. N. Y., died Apr. 5. He had been associated with the firm for 25 years prior to his retirement.
- J. Eugene Neely, purchasing agent and assistant secretary, the Ohio Steel Foundry Co., Lima, Ohio, died Apr. 13.
- Alexander Paterson, 86, cofounder of the Seneca Iron & Steel Co. at Blasdell, N. Y., in 1907, died Apr. 14. He was general manager and treasurer of the company until 1932, when the Seneca firm was merged with Bethlehem Steel and he retired.
- Jay F. Hoover, 70, founder of Hoover & Strong, Inc., Buffalo. died Apr. 14.
- Lester St. Clair, master mechanic at the Studebaker Corp.. South Bend, Ind., since 1936, died Apr. 15.



Cranes are long wearing machines—do not, ordinarily, stand high in repeat business.

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But Northern Cranes have built an exceptional record in repeat orders. A large proportion of our customers regard us as their prime source of cranes—reorder from us when new crane equipment is needed.

One customer has bought 645 Northern Cranes over a period of years. Many customers are regular purchasers—have large numbers in operation.

Repeat business of this sort is obtained only by the very highest quality—the type of quality built into Northern Cranes.

NORTHERN ENGINEERING WORKS

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HEAVY DUTY CRANES • LOW HEADROOM CRANES BUCKET CRANES • TRANSFER CRANES • ELECTRIC HOIST CRANES • HAND CRANES • ELECTRIC HOISTS AIR HOISTS • SPECIAL CRANES AND HOISTS

Dear Editor:

INERT PAINT

Sir:

I have noticed with interest in Newsfront of the Apr. 3 issue, an item, "an inert paint, easily applicable to metals, has been developed to withstand temperatures up to 2400° F. The new material will prevent deoxidation and carburization. It can be used on metals heated to high temperatures as a protection against scaling." Will you kindly advise us whom we might contact to get more information of this material?

Manager Fittings Div.

Ohio Steel Foundry Co.

Lima, Ohio

The coating has been developed by Mr.
 Harry Sweeney of the National Copper
 Paint Corp., 1760 W. Diversey Parkway,
 Chicago 14.—Ed.

CARBON RESTORATION

Sir

In your Mar. 27 issue on Newsfront there is an item which reads as follows: "Carbon restoration to a decarburized steel surface is practical by controlling heating furnace atmospheres. This avoids the expense of machining off the surface of highly stressed parts which have lost their carbon because of heat treatment or heating prior to rolling." Would you kindly send me the above mentioned article and any additional details referring to this item.

P. L. SWOGER Plant Metallurgist

Jessop Steel Co. Washington, Pa.

• Further discussion of the subject is contained in our Apr. 3 issue, p. 133. The information was obtained from a paper by S. E. Cullen, Chief Metallurgist, Surface Combustion Corp., Toledo, Ohio, entitled "What to Look for in the Metal Industries," presented at the American Gas Assn. sales conference on industrial and commercial gas held recently in Boston. The association will forward to you a copy of Mr. Cullen's paper.—Ed.

AGING 75S ALUMINUM

Sir:

Kindly forward us six reprinted copies of your interesting article published in the Jan. 30 issue, entitled "New Short Time Aging Practice for 75S Aluminum Alloy Sheet," by J. S. Nock, Jr. and A. C. Wooll. . .

MILTON H. BANKHARD Research Metallurgist Revere Copper & Brass Inc. Ballimore

MAGNESIUM RESEARCH

Sir:

We would greatly appreciate a copy of the complete list of Magnesium Research Reports available, as mentioned in the Mar. 13 issue, p. 57, together with information regarding their cost.

FRANK VANDERVEER
Materials & Processing Engineering
Sperry Gyroscope Co., Inc.
Great Neck, N. Y.

• The complete listing of reports available covering wartime research on magnesium metallurgy is being forwarded. Orders for these reports should be sent to the Office of Technical Services, Dept. of Commerce, Washington 25, D. C., and should be accompanied by a check or money order payable to the Treasurer of the U. S. Prices, depending on the size of the report, are given in the list.—Ed.

KASENIT

Sir:

We are interested in obtaining information on a product called "Case-knit." This material is used in hard-ening steel. It imparts the same quality and type of finish as cyanide, but has none of the dangerous effects of it. Any information you are able to give us in helping us secure the material would be appreciated.

M. P. KONOPKA Engineering Dept.

Grizzly Mfg. Co. Paulding, Ohio

Kasenit (spelled with a K) is manufactured by the Kasenit Co., 799 Greenwich
 St., New York.—Ed.

SHOT PEENING

Sir:

Could you let me know where I could get, for measuring and controlling shot peening intensities, an Almen specimen gage to measure the arc height of test strips, and a set of A. and C. test strips. When I was in the U.S.A. last year, I saw this apparatus in several laboratories. The dial was bearing the mark: "Federal" and came from the Federal Products Co. As I am equipping a laboratory for making peening tests, I would be much obliged if you could give me this information as soon as possible.

R. DUREUIL 4, Square du Graisivaudan Paris

● The American Wheelabrator & Equipment Co., 412 Byrket Ave., Mishawaka, Ind., can supply the Almen specimen gage and A. and C. test strips that you require for your laboratory.—Ed.

REMINISCENCE

Sir:

This retired and old (80) printer and "string man" has an idea that he's the only one alive today that helped put your publication to bed the week of the Great Blizzard of 1888, which started Mar. 12, the day I somehow struggled through the deep drifts and high and dangerous wind, from my home in Jersey City to your printing plant then located at Grand St. and East River. The first kid (aged 22) but a journeyman printer, to reach the

office that morning, with three later straggling in. That night and the following I slept on mailbags in the pressroom, as my frail physique just wouldn't allow me to dare attempt a homeward journey. Wednesday noon, as it was clearing by then, after the last form went to press, I started for home. By the way, my uncle, the late James C. Bayles, resigned the editorship of your publication (a most awful blunder) to accept the Health Commissionership of N. Y. under Mayor Hewitt.

HOMER M. GREEN

Mt. Joy Farm Middletown, N. Y.

◆ We were delighted to receive your letter telling us about your early days with THE IRON AGE, which was then only 33 yr in existence. That "awful blunder" probably didn't look like that to your uncle at the time.—Ed.

CEMENTED CARBIDES

Sir:

I would appreciate a reprint of your article published in the Jan. 30 issue, entitled "Some Metallurgical Aspects of Cemented Carbides."

Industrial Research Co.

New York

W. J. BAEZA

MAGNETIC WIRE RECORDING

Sir:

Is there any authoritative book on magnetic wire and tape recording and playback, especially with regard to metallized paper? I would like to have information relating to components and circuits, but have seen nothing on the subject except brief, noninformative magazine articles....

PRUL LEO
Precision Mechanical Laboratory
New York

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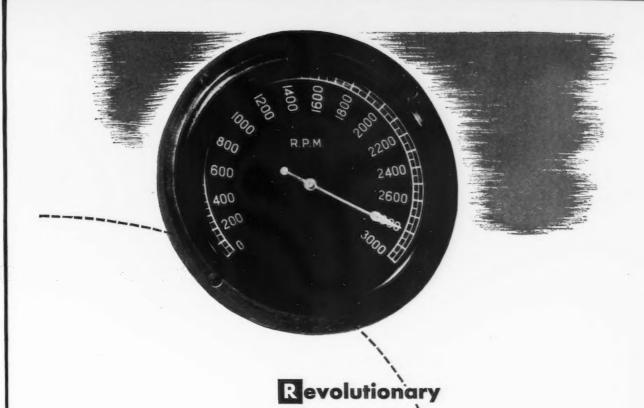
• Dr. S. J. Begun of the Brush Development Co., Perkins & Phillips St., Cleveland, has written an article, "Recent Developments in the Field of Magnetic Recording," which appeared in the January issue of the Society of Motion Picture Engineers Journal. We understand you can obtain a copy by writing to Dr. Begun. The Office of Technical Services, Dept. of Commerce, also has available a report on the subject, by a German.—Ed.

THREAD ROLLING

Sir:

I have been reading the three articles on "Thread Rolling — Theory and Practice" in the Dec. 19, 26 and Jan. 9 issues, and found them to be not only very interesting but also a great deal of information was brought out in the series. If available, would like to have three copies of each article to pass on to our production foremen. I am very much interested in seeing future articles covering cut threading and/or cold heading.

Supt.-Bolt and Nut Dept.
Alabama City, Ala.



Production

 Spindle speeds up to 3000 rpm—for maximum production on small-diameter work, using carbidetipped tools.

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ER Dept. Independent motor-driven tool slides (we call them Uni-Mats)—for universally adaptable tooling on repetitive automatic production.

 Completely electric push-button control of all functions—for high-speed metal turning at maximum efficiency.

These are important reasons why the Monarch Uni-Matic is a revolutionary production method—a machine that brings automatic operation within reach of every shop, no matter how large or how small the lots.

Through application of the Uni-Mat principle, every production job can be tooled up to take advantage of multiple tooling, automatic operation, maximum efficiency at high speed—and universal adaptability. For work as small as 1" and as large as 6" to 8" in diameter and larger, the Uni-Matic will give you peak production at a profit. Like more details? Ask for Bulletin 1701.

THE MONARCH MACHINE TOOL CO.
Sidney, Ohio



FOR A GOOD TURN FASTER -

TURN TO MONARCH

Industrial News Summary...

- Steel Production Outlook Bright
- Ingot Rate Up 11/2 Points to 96.5
- Scrap Prices Slide Off Further

THE groundwork was laid this week for a steel output performance that may rival 1944 when an all-time-high of 89.6 million tons of steel was produced. The coal mine problem is still in the picture but some sources believe there is a good chance of it being cleaned up by July 1.

Steel production from Jan. 1 to the middle of this week totaled slightly more than 28 million tons. This rate, if continued for a year, would turn out 30 pct more steel than in the peacetime year of 1939 and 39 pct more than in 1929 and only about 2 pct less than was produced in 1944.

The steel rate for the country this week is up $1\frac{1}{2}$ points to 96.5 pct of rated capacity and all signs point to a continuation of this high level for some time. At Pittsburgh steel operations this week are 103 pct of capacity and at Chicago the rate has climbed to 98 pct. At Buffalo activity is 102 pct and at Detroit 102.5.

THE steel industry this week got additional help in shouldering the new heavy wage bill when scrap prices at major centers slid off further. Average prices on heavy melting steel were off \$2.50 a ton at Pittsburg, 75¢ a ton at Philadelphia and \$2.50 at Chicago. These declines forced THE IRON AGE scrap composite down to \$29.92 a gross ton, off \$1.91 a ton from last week's figure of \$31.83. This week's scrap composite is \$1.08 a ton less than the 1947 low of \$31 a ton touched on Jan. 7 during the upward movement of scrap prices.

As expected, steel earnings for the first quarter of this year showed a substantial increase from fourth quarter figures but they do not reflect the new wage costs which are retroactive to the beginning of the second quarter. First quarter earnings reflected the full effects of base price and extra increases instituted during the latter part of December 1946 and early January 1947. Much of this is expected to be dissipated in the second quarter by high wage costs and some increases in the price of materials used by the steel industry.

There was nothing in the picture this past week which indicated the probability of a basic cut in steel prices. Most companies do not yet know the full cost of the new wage agreement. Until that time—and it may take a few months—no firm can give consideration to lower steel prices. Customers have been exerting pressure on some steel firms to eliminate the sales price policy of "price at time of shipment."

Keystone Steel & Wire Co. at Peoria, Ill., has notified its customers that second quarter shipments will be priced at no more than current steel quotations. Whether or not larger steel companies will return to the prewar policy of quarterly announcement of steel prices remains to be seen, but they are privately giving consideration to the problem.

THE current flow of steel to consumers has been so heavy in recent weeks that a continuation of this volume of shipments for the next several months will result in peak output of manufactured goods. By June or July many steel users will find almost a normal balance between supply and demand with the exception of some flat-rolled steel items. Some customers are again eyeing their unbalanced inventories and are concentrating new orders on those items that are the shortest. There is little chance that the tightness in hot and cold-rolled sheets will be materially eased much before the end of the year.

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OF CAPACITY

There was no sign this week of any slackening in demand for steel products. Most firms continued to report a volume of orders running ahead of the same period a year ago. In most cases the total of new steel orders in April was only slightly below March volume. While March is usually a peak month in sales and production it is expected that final April shipment figures will be just as great.

Hard pressed pig iron users can expect a better supply over the next few months. March pig iron output was close to 92 pct of capacity and April figures equaled or exceeded that amount. Some of this increase in iron output has been used for steelmaking but there has also been a significant increase in the amount of iron going into merchant trade channels. About a week ago at least 80 pct of pig iron users had no more than 10 to 15 days inventory.

Inventories of some pig iron users have fallen below a 5-day supply and some foundries are even on a day-to-day basis. Like other shortages, however, a sharp increase in pig iron supplies might accentuate labor shortages in some areas.

ABOR experts in the steel industry as well as union sources believe that the prospects for industrial peace are better now than at any time in many years. Safeguards are being provided to eliminate misunderstandings which in the past have resulted in troublesome wildcat strikes. Over the past year the number of unauthorized strikes in the steel industry has been steadily declining.

The provision in the U. S. Steel wage contract which calls for general discussions between the company and the union every 3 months is expected to go a long way towards completely eliminating trouble-some production shutdowns. Some management sources privately look for a marked increase in labor productivity as the result of new wage increases and also because of the social gains made by the union in the new pacts.

- MORE CORN—The new process for making industrial alcohol from corn cobs has proved so successful that some producers are thinking of adopting the process. The U. S. Department of Agriculture's pilot plant at Peoria, Ill., the first of its kind, is being closely studied by the alcohol makers.
- PUSH PULL CLICK CLICK—Pullman-Standard Car Mfg. Co. plans to step up production of its Michigan City, Ind., plant so that a box car will be completed every 10 min by mid-summer.

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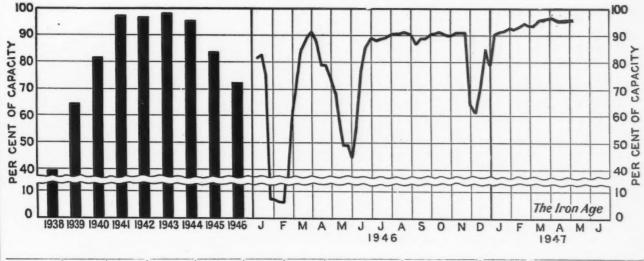
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- MORE FIGURES—Average earnings of workers in manufacturing industries increased \$6 per week or 14 pct in 1946 while consumer prices rose 18 pct, according to the Bureau of Labor Statistics.
- BREAK-EVEN POINT—One of U. S. Steel's topflight executives, in addressing a meeting of Chicago Corporation sales personnel, asserted that present prices could only be maintained as long as steel operating rates exceed 80 pct. Present operating costs are such, the speaker said, that if operations drop below 80 pct steel prices must be increased if any profit margin is to be maintained. Prior to the war it was said that 70 pct operations was the breakeven point. This opinion is not universally held in the steel industry and the number of possible break-even points is amazing. Queried on this point recently, Eugene G. Grace, Bethlehem Steel board chairman, declined to estimate what his company's break-even point might be.
- EXPORT RULE—Export preference certificates issued by CPA do not apply to sales of surplus materials by government agencies, according to a clarifying amendment to Allocations Regulation 2, issued Apr. 22. Such certificates on certified export orders will not obligate a government agency to sell and will not have the effect of establishing priority among buyers, CPA said.
- AUTO OUTPUT—New passenger car output for March was 302,954 compared to 263,998 in February. Auto manufacturers forecast a total of 335,270 passenger cars in April: 330,636 in May and 338,538 in June.

- PROFIT AND LOSS DATA—With the mailing of report forms to 8500 corporations requesting them to file brief profit and loss statements and balance sheets for the first quarter of 1947, the Federal Trade Commission has resumed the job of assembling and analyzing corporate data for the purpose of reporting the overall financial and operating condition of industry. Instituted shortly before the war to meet requests by business, government agencies, trade associations, etc., the work was carried on during the war years largely by OPA and other war agencies. It was returned to FTC by executive order last December.
- CANADIAN NAIL OUTPUT—Canadian wire nail production in February was 6015 tons, against 5531 tons in February, 1946. Output of other types of nails in February with 1946 figures in brackets: iron and steel cut nails, 73 (90) tons; steel wire staples, 206 (154) tons; steel brass and copper tacks, 152 (215) tons. Output of steel wire in February totalled 24,078 tons compared with 26,349 tons in January and 20,740 tons in February last year. Production of steel wire fencing amounted to 2361 tons in February against 2323 tons in January and 1887 tons in February, 1946.
- U. S. STEEL EARNINGS—U. S. Steel Corp. reported a net income of \$39,234,511 for the first quarter of 1947 compared with \$31,215,636 in the fourth quarter of 1946 and \$33,329,353 in the third quarter of 1946. On a per common share basis first quarter 1947 earnings were \$3.78 compared with \$2.86. In the fourth quarter of 1946 and \$3.11 in the third quarter of 1946. Earnings per share for the year 1946 were \$7.29 and in 1945 were \$3.76. Shipments in the first quarter of this year were 4,843,647 net tons compared with 4,902,742 net tons in the fourth quarter of 1946 and 4,457,557 in the third quarter of 1946. Steel production in the first quarter of this year averaged 97.9 pct compared with 87.4 pct in the fourth quarter of 1946 and 94.3 pct in the third quarter of 1946.
- METALWORKING EMPLOYMENT—March employment in the iron, steel and nonferrous industries is 20,000 higher than January; 7000 higher than February. Employment in all manufacturing was steady.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 22	101.5	96.0	92.0°	90.0	95.5°	102.0	100.0	99.0	102.5	98.0	95.0	88.5	95.0	95.0
April 29	103.0	98.0	92.0	90.5	99.5	102.0	100.0	99.0	102.5	94.0	103.0	73.0	95.0	96.5

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Steel Companies Show Some Tendency to Push Profitable Products

Pittsburgh

· · Steel companies have shown a definite tendency to push production of their more profitable items during the past year but tonnagewise there is more of every product being made today than there was before the war. Total steel demand is so great that many disappointed customers are prone to point scornfully at steel producers and charge them with favoring the high profit mill products. To some extent this is true, but the overall picture - based on an analysis of the industry's product mix-is not as distorted as many believe. Many factors stop the steel companies from going too far along these lines.

Governmental and public pressure forced the increased output of nails in 1946 and 1947. Old line customers have forced the industry to make the less profitable items as well as the "cream" items. Further, limitations of finishing capacity have tended to adjust product mix. Also, plain common sense made it inevitable that all steel products would be produced, regardless of price.

An examination of 1946 steel production, war production, and prewar production shows to what extent high profit steel items were favored since the end of the war.

Production figures used here are from American Iron & Steel Institute data; compilation by The Iron Age.

The accompanying graphs illustrate the trends. Each chart is based on a single steel product or a group of related products, and shows what percentage of finished steel production for sale was accounted for by the named product.

Production of semi-finished steel (ingots, billets, blooms, slabs, tube rounds, and sheet and tin bars) is back to just about prewar levels. What the curve doesn't show, however, is that the main producers of sheet bar have gone out of this business, which has resulted in the complete annihilation of the privately owned and operated hand sheet mills. Likewise, the inclination of producers to reduce their sales of tube

But Product Mix Study Shows Less Unbalance Than Is Commonly Believed

By THOMAS E. LLOYD
Pittsburgh Regional Editor

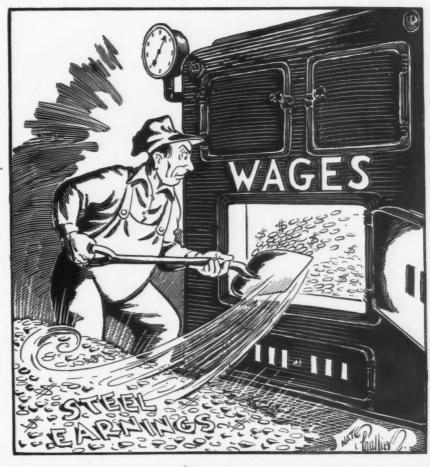
rounds to independent seamless tube producers is likely to cause trouble. The tonnage of semifinished sold in 1946 was better than during the 1936 to 1939 period, but the complete or partial withdrawal of producers from certain phases of this market has caused concern among small fabricators. Based on prewar production, the output of semi-finished

steel should have been, in 1946, about 1.8 million net tons, whereas actually it totalled 1,949,624 net tons.

Structural and sheet piling production has been gaining steadily since the end of the war and is now about at its prewar status. In 1946, these items accounted for 7.5 pct of the finished steel output, which is comparable to the 1936-1939 period. Structural output in 1946 totalled 3,474,284 tons, and on the basis of prewar output it should have amounted to 3.5 million net tons.

Plates, the high priority item of the war, slipped off in production. From a peak output of better than 1 million tons a month in 1943, production dropped to 4,152,-181 tons in 1946. Average output from 1936 through 1939 was 2.5

Earmarked Earnings



million tons a year, and on this basis, production in 1946 should have been 3.8 million tons. Production-wise and percentage-wise plates still hold a lead over the

prewar position.

Rails and rail accessories make up a group of products that are produced in consistent volume. All through the war, with the aid of government priorities, railroads got these items. Tonnagewise, railroads got more in 1946 than before the war, but rails and rail accessories today make up about the same percentage of finished steel output as they did before the war.

Hot-rolled carbon bars account for a relatively large part of finished steel production. Bars and flat rolled steel together make up about 25 pct of shipments. From the standpoint of tonnage, bar shipments increased steadily throughout the war, but on the basis of percentage of finished steel output the real spurt came

in 1943 and held through 1946. Production of hot-rolled carbon bars in 1946 amounted to slightly over 5 million tons, or 10.3 pct of total finished steel shipments. On the basis of 1936-1939 shipments, 1946 shipments should have been 4.7 million tons or 9.6 pct of finished steel production for sale.

Reinforcing bars for concrete, notoriously a low-profit item and an item dependent upon rejected heats of steel, are low from both production and percentage standpoints, despite a sustained heavy demand. Concrete bars made up 2.1 pct of finished steel output in 1946, whereas previously they had been as high as 3.3 pct. Tonnage produced in 1946 from new billet steel just about equalled 1939 output, slightly better than 1 million tons. Based on 1936-1939 output. 1946 production should have been at least 1.4 million net tons. Here is an extreme example of low productivity of a specific steel Cold-finished bar production has held its late war position. Tonnage and percentage-wise, cold-finished bar output is high. Likewise, it is a high profit item. Cold finished carbon bars account for about 2.7 pct of finished steel output, whereas prewar output averaged about 1.7 pct of finished steel output. Production in 1946 totalled 1,316,579 net tons, but based upon 1936-1939 output, this amount should have been closer to 800,000 tons.

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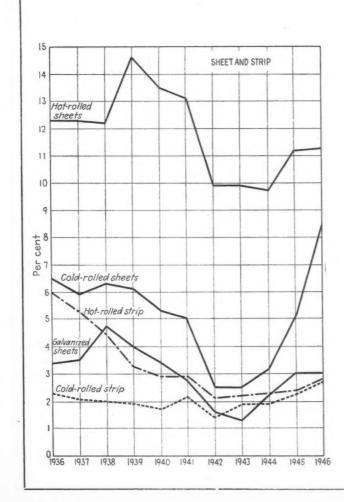
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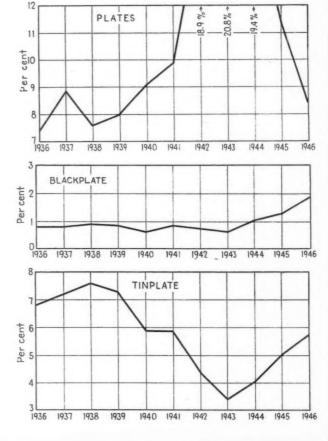
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The pipe and tubing items have fared about average as compared to prewar output, with the possible exception of seamless and lapwelded tubing. This is mainly accounted for by the fact that some producers are going out of the market on certain sizes of lapwelded pipe, preferring to make and sell buttwelded or seamless in its place. Tonnage was higher in 1946 than before the war, but the percentage of each type is quite comparable. Seamless, still

Steel Product Output In





off in 1946 when compared with prewar percentages, will likely regain considerable of its position in 1947.

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Wire rods, actually a semifinished item, fall into the same category as many other semifinished items. Production for sale in 1946 is comparable percentagewise with production for sale before the war. Tonnage-wise it is ahead of prewar production. Wire rod production for sale in 1946 totalled 679,998 net tons or 1.4 pct of the total finished steel output. Based on 1936-1939 output, production should have been exactly 1.4 pct of the total finished output—which it was.

Drawn wire production in 1946 amounted to 4 pct of finished steel output, better than the 1936-1939 average, and production totalled 1,933,124 net tons, about 25 pct better than any prewar year.

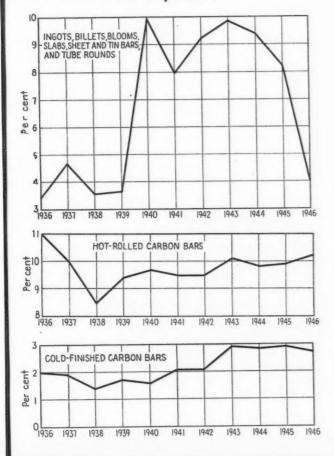
Production of nails and staples, while up tonnage-wise, is low percentage-wise. Production of 636,-

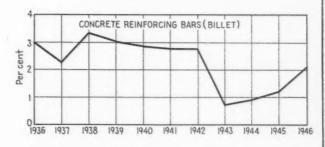
632 tons in 1946 accounted for 1.3 pct of finished steel shipped, but on the basis of 1936-1939, production should have been about 875,-000 net tons or 1.8 pct of shipments. Price boosts both before and after OPA was killed plus plenty of governmental and public pressure helped nail output or it would have likely been about 50 pct of what it actually totalled. Barbed and barbless wire, woven wire fencing, and bale ties, are still lagging percentage-wise behind their prewar position, but 1947 will probably bring them back. From a tonnage standpoint, these products show improvement. Both domestic and export demand is high and 1947 may see an increase in their output.

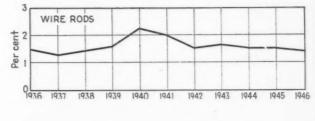
The need of the war saw blackplate production start upward. Production of 906,337 net tons in 1946 was a new high and amounted to 1.9 pct of steel shipments. Prior to the war, blackplate accounted for less than 1 pct of shipments, and based on prewar output, 1946 shipments should have been only 400,000 tons. Instead, shipments more than doubled that amount.

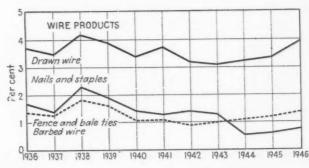
Tinplate production is relatively high now and was high in 1946, but if tin were easier to get it is likely that production would climb further. The acute demand for tinplate all over the world for the packaging of food has made the United States Government peg a certain percentage of tinplate output for export every month. Actually, however, output is less than might be expected. On the basis of prewar production (1936-1939), production in 1946 should have totalled 3.5 million net tons, while it only amounted to 2,833,-830 net tons. This production was 5.8 pct of total shipments, as shown in the graph, whereas it should have been, based on prewar output about 7.2 pct. While a good product from a profit standpoint, the steel industry was

Percent of Total Shipments









hampered by tin shortages.

Hot-rolled sheet output in 1946 hit a high of 5,521,463 net tons or 11.3 pct of shipments of finished steel. The graph shows this to be an improvement percentagewise over 1945, but 1945 production was higher. On the basis of 1936-1939 output, hot-rolled sheet production should have been more than 6 million tons. The main reason for the poor relative showing in hot-rolled sheets in 1946 was obviously the fact that this item is the raw material for the more profitable cold-rolled sheets and tinplate. Also, many companies that produce hot-rolled sheet are fabricating that sheet into end products, thus limiting the amount for sale. Jones & Laughlin, Weirton, Wheeling, and Sharon were recently reported by the Pressed Metal Institute as going out of the market on hotrolled sheets because their own fabricating and finishing requirements took all available hotrolled sheet capacity. Thus, while 11.3 pct of finished steel shipments may seem high for hotrolled sheets, it is actually less percentage-wise than before the war, and far less than the 14.6 pct shown for the peak year, 1939.

Cold-rolled sheet production in 1946 was more than its proportionate share. Output totalled 4,-075,554 net tons, or 8.4 pct of finished shipments. Tonnage-wise and percentage-wise this is a new high. On the basis of 1936-1939 output, the 1946 total should have

been about 3 million tons, or 6.2 pct of finished steel shipments. Cold-rolled sheets are considered a leading profit item.

Galvanized sheet output is below normal, partly because of price and the high cost of zinc. Shipments in 1946 totalled 1,462,-053 net tons, or 3 pct of total shipments. On the basis of prewar shipments, 1946 output should have been 3.9 pct of total steel shipments, or 1,900,000 net tons, about 30 pct more than was ship-

The situation that occurred with hot and cold-rolled sheets was duplicated in a minor way with hot and cold-rolled strip. Production of hot-rolled strip in 1946 was 1,363,812 net tons, or 2.8 pct of steel shipments. On the basis of prewar output, it should have been 2 million net tons. Coldrolled strip, on the other hand, fared better. Output in 1946 was 1,282,146 net tons or 2.6 pct of steel shipments. On the prewar basis, it should have totalled 1 million tons or 2 pct of finished shipments.

Prior to the war, hot-rolled strip accounted for as much as 6 pct of shipments (1936 on graph), but the product fell in relative importance to 2.1 pct in 1942. It is just barely above that now.

Thus, while there have been changes in the product mix of the steel industry, they have not been too drastic. The acute demand for steel products of every nature has been a policing force in preventing too much emphasis on the output of any specific type of product. The current effort of the steel industry to expand its flatrolled capacity will tend to alleviate the situation that currently exists on hot-rolled sheets. This shortage coupled with the unwillingness of some producers to sell has been serious. Carried much further, it could mean the destruction of many small manufacturers and fabricators. The steel industry neither wants this nor can afford it, since after the current heyday it will need many more of those small consumers.

CF&I Earnings Climb

Denver

• • • The Colorado Fuel & Iron Corp. reported net earnings after estimated taxes, depreciation, depletion and interest of \$1,712,323 for the quarter ended Mar. 31, compared with a loss of \$1,667,932 for the corresponding period ended Mar. 31, 1946, and net earnings of \$876,310 for the last preceding quarter ended Dec. 31, 1946. The earnings for the quarter ended Mar. 31, 1947, represents \$1.40 per common share on 1,126,-775 shares after quarterly pre-ferred stock dividend require-

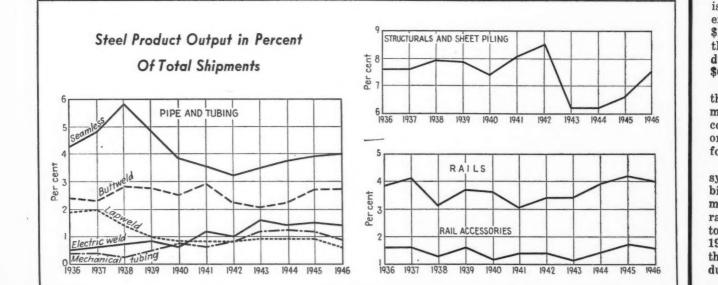
Earnings on the same basis represents \$2.87 per share on 1,126,775 shares for the 9-month period ended Mar. 31, 1947.

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Bethlehem Steel Corp. Earns \$16 Million In Quarter: 35 Pct Gain

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• • • Bethlehem Steel Corp.'s first quarter earnings of \$16,090,426 were almost 35 pct higher than the \$11,937,281 earned by the company in the last quarter of 1946. In releasing the first quarter 1947 financial statement, Eugene G. Grace, Bethlehem board chairman, indicated that the \$4.84 earned on the common stock was just 10¢ less than earnings in the company's record quarter, the final quarter of 1944.

Settlement with the United Steelworkers of America on a 15¢ hourly wage increase will cost the company about \$3 on every ton of finished steel shipped, Mr. Grace

Bethlehem Steel Earning in Brief

First Quarter 1947	Fourth Quarter 1946	First Quarter 1946	Fourth Quarter 1945	Year 1946	Year 1945
Net income\$16,090,426	\$11,937,281	\$4,804,438	\$11,447,858	\$41,731,931	\$35,947,116
Per common share \$4.84	\$3.45	\$1.06	\$3.29	\$11.79	\$9.52
Sales in millions \$238	\$226	\$142	\$225	\$788	\$1327
Ingot Operations, pet 98.0	85.1	49.7	83.1	77.6	91.7

said. If prices are maintained at their present level—and he definitely saw no prospect of steel price cuts at this time—Mr. Grace said that the new wage bill would cost Bethlehem between \$5 and \$6 a share on the common stock. This is assuming, he said, that present high operating rates are maintained, though he would hazard no guess on his company's breakeven point.

Earnings represented 7.1 pct return on billings, Mr. Grace pointed out, compared to 9.2 pct, 7.8 pct and 9.3 pct for the years 1937,

1939 and 1940, respectively.

The total first quarter payroll was given as \$100,910,000, compared to \$97,396,000 in the previous quarter. On the same basis, average employees were 140,352 against 140,655 and average hourly earnings were \$1.486 and \$1.492, respectively. Weekly earnings in the first quarter averaged \$55.91 against \$52.70. Hours worked per week increased from 35.3 to 37.6.

Further data and other comparative figures are given in the accompanying table.

Reports Business Will Spend \$13.9 Billion For Construction in 1947

Washington

• • • American business expects to expend around \$13.9 billion during 1947 for construction of new plants and purchase of new equipment plus another \$600 million on old or used plants and equipment, it is forecast by the Commerce Dept. and the SEC. Such expenditures are expected to level off and probably decline during and after the last half of the year.

This estimated plant expansion is nearly \$2 billion above similar expenditures in 1946 when about \$12 billion was spent and more than double that of 1945 when industry spending was limited to \$6.6 billion.

According to a joint survey by the two federal agencies, the manufacturing industries will account for slightly less than half, or \$6.2 billion, of the expenditures for expansion.

Expenditures by public utilities systems are expected to reach \$1.7 billion; railroads, \$1 billion, and mining, \$600 million. While the rate of construction is expected to be greater for the first half of 1947 in most cases, indications are that railroad outlays will go up during the last half.

While there has been a steady increase in expenditures for new

plants and equipment since the beginning of 1945, the indications are that the peak rate was probably reached in the last quarter of 1946 (\$3.8 billion), although if the predicted expenditures for 1947 eventuate, the total for the year will be about 15 pct above last year.

The anticipated expenditures also would be 70 pct above 1941 and 50 pct above 1929, two selected prewar highs. If the 1947 expenditures were adjusted to allow for increased prices of building materials, however, the 1946 would probably be greater than that expected for 1947.

This 1947 plant expansion forecast is based largely on reports submitted by corporations registered with the SEC plus a sampling of both corporated and unincorporated firms which report to the Commerce Dept.

Quarterly Income Up

Rochester

• • • The Symington-Gould Corp. reported net income of \$20,859 for the first quarter of 1947 compared with net loss of \$497,490 in the same period of last year. Operations in the first 3 months of this year showed a net loss of \$10,112, after provision for plant depreciation, reserves, franchise, federal taxes, and all selling and general expenses.

Now Quotes Firm Prices

• • • Buffalo Forge Co. and its subsidiary, Buffalo Pumps, Inc., announced that, effective Apr. 11, firm prices will be quoted on all lines of fans and blowers, powerplant and air-conditioning equipment, unit heaters and pumps.

EXPENDITURES ON NEW PLANT AND EQUIPMENT

1939 - - - - 1947

(Millions of dollars)

1939	1940	1941	1942	1943	1944	1945	1946	1947
Manufacturing 1930	2580	3400	2760	2250	2390	3210	5910	6170
Mining 380	560	680	410	360	500	440	560	610
Railroads 280	440	560	540	460	580	550	570	1000
Electric-Gas utilities 480	550	710	680	540	490	630	1040	1690
Commercial and Misc 2130		2840	1720	920	1250	1800	3960	4420
Total	6490	8190	6110	4530	5210	6630	12040	13890

These estimated expenditures do not include agriculture. Those for the years 1939-44 are revised Federal Reserve Board estimates and may vary from Dept. of Commerce totals. The Commercial and Miscellaneous category above includes service, trade, finance, communication, and transportation facilities other than railroad...

Weirton Signs With Its Independent for 16½¢; Boosts Reporting Pay

Weirton, W. Va.

• • Less than a week after the USWA had agreed upon a working contract with the U.S. Steel Corp., Weirton Steel Co. announced a new agreement with the Weirton Independent Union, Inc., which represents workers in the Weirton plant. Shading the USWA contract in many phases, the new Weirton contract, dated Apr. 25, calls for an increase in the basic minimum rate from \$1.00 an hr to \$1.161/2 per hr, and an increase of 12.5¢ an hr for all hourly, piecework, and tonnage employees of the company whose wages are over the present minimum base rate. The contract was announced jointly by J. Stewart Williamson, vice-president in charge of operations for Weirton Steel Co., and Edward A. Ross, president of the Weirton Independent Union, Inc. All provisions of the contract are retroactive to Apr. 1.

It was stipulated in the contract that its terms would not affect agreements now under negotiation on wage inequities, which for some time have been subject to a joint plantwide survey by the union and the management. Mr. Ross, for the union, said that "once again, the Weirton Independent Union comes out of negotiations with the best contract in the steel industry. The base rate scale is the highest in the industry and this means the highest ever paid to steel workers."

The vacation plan calls for 1 week vacation for 1 up to 5 year service; 2 weeks for 5 up to 15 year service; and an additional working day of

vacation for each 2 year service beyond 15 year to a maximum of 3 weeks or 18 working days for 25 year service.

If an employee is required to report for work and no work on his regular job is available, he will be given either 8 hr work on some other job or he will be paid 6 hr at his regular rate. This is an increase of 3 hr in reporting time compensation.

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Allegheny Ludlum Nets \$1,829,609 in Quarter

Pittsburgh

• • Net earnings for the first quarter of 1947 of \$1,829,609 were announced by Allegheny Ludlum Steel Corp. Sales for the first quarter were \$24,105,492.

During the first quarter of 1946 the company's net earnings were \$252,043. First quarter earnings in 1947, however, were lower than those of the final quarter of 1946 when the company netted \$2,040,207.

In announcing the earnings H. G. Batcheller, president, declared that the first quarter did not measure up to original expectations because of the shortage of natural gas in the Pittsburgh district mills. Dur-

ing the cold weather, lasting from January through March, the company lost the equivalent of 22 days of around-the-clock operations.

The company's employees also were hard hit. Loss to the workers at Brackenridge and at the company's West Leechburg, Pa., plant, amounted to 47,000 man-days.

Keystone Steel & Wire Sales Soar by 40 Pct

Peoria, Ill.

• • • For the 3 months ended Mar. 31, 1947, the third quarter of the company's fiscal year, Keystone Steel & Wire Co. reports net profit of \$1,342,815 after all charges, including federal income taxes, equivalent to \$2.18 a share on 615,000 shares of capital stock outstanding after the company's purchase for retirement of 142,632 shares as of Feb. 20, 1947. This compares with net of \$528,901 for the third quarter of last year, equivalent to 86¢ a share on the presently outstanding shares and to 69¢ a share on 757,632 shares outstanding a year ago.

Third quarter sales of \$7,488,905 set a new high quarterly record and compared with \$5,350,924 for the same quarter of last year, an increase of almost 40 pct, according to Reuben E. Sommer, president. On a tonnage basis, however, sales continued slightly

below a year ago.

Cincinnati Milling Net Off

Cincinnati

• • • Earnings of the Cincinnati Milling Machine Co., in the first quarter of 1947 were \$346,615, equal to 35¢ a common share after preferred dividends and compares with earnings of \$550,330 or 59¢ a share in the first quarter of 1946, Frederick V. Geier, president, announced.

MORE SHEET STEEL DUE: Steel goes up at the \$25 million steel sheet and tinplate mill of Columbia Steel Co., at Pittsburgh, Calif. This will be the tinplate warehouse, part of the project that will house 12,500 tons of machinery and permit Columbia to supply about half a million tons of sheet and tinplate to the West.



Call GM-UAW Pact A Shotgun Wedding, Not Meeting of Minds

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•••• In the opinion of most observers here the new General Motors-UAW (CIO) wage agreement has more of the earmarks of a shotgun wedding than a meeting of minds.

Walter Reuther, president of the UAW has indicated his displeasure at being forced into a weak bargaining position and has promised reprisals at the earliest opportunity. Such an opportunity is expected to present itself during negotiations for social security and old age pensions which remain a subject for further bargaining between the corporation and the union.

Ford Motor Co. whose contract remains in effect until May 31 has been asked to begin wage negotiations with the union immediately.

Under the new GM agreement, workers will get improved vacation pay. Heretofore, GM employees with 1 to 3 years' seniority received 2 pct of their annual pay as a vacation allowance; those with 3 to 5 years received 3 pct and those with seniority of 5 years or

Back to Normalcy

Peoria, Ill.

• • • The Keystone Steel & Wire Co. has returned to the prewar policy of steel pricing and has notified its customers that business now on the books or new orders accepted for second quarter shipment will carry prices no higher than current quotations.

The company's statement reads: "Since Sept. 26, 1939, we have sold our products on the basis of price in effect on date of shipment.

"We today discard this dis-

agreeable feature of selling as we feel that uncertainties of wage scales and costs of materials are largely removed.

"All accepted orders now on our books, or any new orders that may be accepted for second quarter shipment, will be invoiced at prices no higher than Keystone price lists in effect today. Please understand, however, that we do not anticipate any immediate price reduction.

"Our price policy for the third quarter of 1947 will be announced early in June."

more were given 41/2 pct credits.

The new agreement calls for pay to employees in lieu of vacations on a basis of 40 hr for employees with 1 year seniority by July 1, 60 hr for those with 3 years' seniority and 80 hr for those with seniority of 5 years or more.

Reuther has announced that the new agreement brings the total wage increase to "a little more" than 15¢ per hr and has called the vacation plan "major progress."

Some significance has been attached to the fact that C. E. Wilson, GM president, although specifi-

cally invited to do so by the union, did not participate in the wage discussions.

The consensus here is that the new agreement is at best a truce between the union and General Motors and that it can hardly be termed "labor peace."

General Motors has not indicated whether or not car prices are likely to be affected by the wage boost which is expected to cost the corporation \$65 million per year.

The agreement which union employees are expected to ratify will remain in effect until Apr. 28, 1948.

Navy Sponsors Trip To Survey 200,000 Tons Of Western Pacific Scrap

Washington

• • • Navy plans to sponsor a scrap survey trip through the Western Pacific were revealed last week. At the same time, Military Government officials in Germany announced plans were underway to make available for export limited quantities of German civilian-generated scrap.

The Navy announced that it would sponsor the survey trip after a conference between Robert W. Wolcott, Steel, Foundry & Scrap Industries' Committee for Expediting of Iron and Steel Scrap and Assistant Secretary of the Navy W. John Kenney. Making the trip, scheduled for the middle of this month, will be Leonard Abrams, representing the Institute of Scrap

Iron & Steel, and Leslie G. Knight, Bethlehem Steel Co., representing the steel industry. The trip will cover points in the Admiralty, Mariannas, and Philippine Islands.

The Navy estimates that there is available about 200,000 tons of miscellaneous scrap in the Western Pacific. However, under present government regulations money realized from the sale of such scrap must be turned over to the general fund of the Treasury, making it economically unfeasible for the Navy to pay for transportation costs to the United States.

While the 188,000 tons of ferrous scrap offered recently in Germany and Austria has been sold to American buyers, this same financial situation confronts the Army and is the biggest bottleneck in the entire program.

The purpose of the Navy trip to the Pacific is similar to that of previous Army sponsored trips to Europe, namely, to determine whether it is practical to return any of the scrap overseas to this country. It is reported that large quantities are not anticipated from Germany, largely due to the needs of the German economy and British competition.

Measure Would Decrease Building Subsidy Program

Washington

• • • • A measure which would reduce the building subsidy program from the \$400 million authorized by the 79th Congress to \$100 million has been introduced by Sen. Homer E. Capehart (R-Ind).

Since approximately \$65 million has already been spent, in effect, this would leave \$35 million for premium payments on pig iron and cast iron soil pipe production, the two building items which remain subsidized.

THE IRON AGE, May 1, 1947-105

Pressed Metal Executive Charges Million-Ton Steel Black Market

Cleveland

• • • An alleged black market in steel involving about 1 million tons of sheet and strip, chiefly hot-rolled, was reported to district members of the Pressed Metal Institute at their meeting here by Tom J. Smith, Jr., newly elected president of PMI.

In a fiery denunciation of the steel industry, Mr. Smith revealed that he was sending to the American Iron & Steel Institute copies of all over-priced offerings of sheet and strip.

"PMI is going into this black market with both feet," he warned, "and we are going to continue our investigation of the curtailment of hot-rolled production and the scrap situation."

He added that PMI could take credit for scrap now being returned from Europe in bottoms as ballast.

By implication, Mr. Smith indicated that some members of the steel industry were connected with the black market and that some PMI members had been approached by representatives of steel companies and asked to cal! off PMI's efforts to unearth and report black market transactions.

"Our bemused steel masters wanted the campaign stopped," he

"My members need steel and we'll do everything we can to uncover as much of this we can," he promised.

Mr. Smith then quoted from a lengthy report of a stamping manufacturer on numerous overpriced offerings of steel ranging from 5000 to 300,000 tons at prices up to \$250 a ton.

One alleged offering of 100,000 tons was priced mill plus 40 plus 10 plus \$15. This was cold-rolled material. Another deal was said to involve 100,000 tons for shipment over a period of 1 year, with 10,000 tons a month shipped to the consumer, who was to keep 8000 tons and ship the remaining 2000 tons of sheets to another consumer to be designated.

Another offer, which according

But Steel Sales Official Says Industry Will Come Out With Skirts Clean

> By BILL LLOYD Cleveland Regional Editor

to Mr. Smith emanated from at least four different sources, consisted of an offering of 300,000 tons over a 3-year period.

He said he had sent copies of these offerings to "interested" government bureaus in Washington, implying that the Federal Trade Commission was among

Prior to Mr. Smith's remarks, R. C. Todd, assistant vice-president in charge of sales, American Rolling Mill Co., stoutly defended the steel industry and predicted that the industry "will come out of the alleged black market in clean skirts.'

Mr. Todd admitted the steel industry was under sharp attack by its friends, "people who ought to know us," but warned that offhand remarks can have dangerous implications.

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He denied the charge made by Mr. Smith in a PMI bulletin that the aluminum killed sheet was a device the steel producers used to get more money for their steel under OPA. Mr. Todd said American Rolling Mill Co. secured a patent on the aluminum killed sheet in 1937 and first charged \$10 a ton extra on this product.

He also refuted another PMI charge that there is an industrywide attempt (on the part of steel producers) to curtail production of hot-rolled sheets, pickled and

Pointing out that 1 million tons of hand mill capacity for processing sheets was taken out during the war, Mr. Todd went on to present a chart showing American Rolling Mill Co. shipments of hotrolled sheets are 140 pct of hotrolled shipments in 1940. Armco's allotment of hot-rolled in 1947 is 25,500 tons, the chart showed.

Part of the problem today in hot-rolled, Mr. Todd said, is that 1 million tons have been taken from the normal channels of trade through the sale of small, nonintegrated mills to some of the major consumers.

He pointed out that a lot of hotrolled material is going to the railroads, but added that hotrolled prices are such that his company, at least, does not want some of the hot-rolled tonnage now on its books.

According to Mr. Todd, some people assume that new coldrolling capacity will mean the end of hot-rolled, since hot-rolled products are unable to stand on their own feet and must be subsidized by the specialties. Actually, this means that the hot-rolled price must go up, since there has to be hot-rolled for automobiles and refrigerators, among other things, and the steel industry cannot withdraw if they are to sell the lighter gage specialty sheets. does

Stampers Select

• • The following were elected officers of the Pressed Metal Institute at a meeting held here last week: President, Tom J. Smith, Jr.; vice-president, Carter C. Higgins, vice-president of Worcester Pressed Steel Co.; secretary and treasurer, J. J. Boehm, president of Boehm

Pressed Steel Co., Cleveland.

Members of the executive committee include the following: Cyril Greenhill, president of Acklin Stamping Co., Toledo; Carter C. Higgins; J. J. Boehm; C. W. Custer, president of the American Stamping Co., Cleve-land; and Harvey S. Johnson, vice-president of the Metal Specialty Co., Cincinnati.

Weekly Gallup Polls . . .

American Patience Short Toward Communist Activity Here

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• • • American patience with Communists and Communist activity within the confines of the United States is very short, according to George Gallup, director, American Institute of Public Opinion.

This impatience has been reflected on growing sentiment in Washington to bear down hard on Red activities. It has been revealed in hearings on the House Committee on Un-American Activities. It is further shown in President Truman's order for a housecleaning of U.S. Communists from government jobs.

The movement certainly has the full sympathy of the American people, polls across the vast stretches of this nation find.

The American people believe:

(1) That U.S. Communists are loyal to Russia first, U. S. second.

(2) That membership in the Communist Party should be banned in this country by law.

(3) That American citizens who are members of the Communist Party should be forbidden to hold Civil Service jobs with the gov-

In making its study, the institute had field reporters ask:

(1) "Do you think membership in the Communist Party in this country should be forbidden by law?"

The replies:

																	Pct
Yes																	61
No		*					*	×	*	×			*				26
No																	13

Analysis of sentiment among various segments of the voting population finds only one group -those with college training who think it is a bad idea to place a ban on membership in the Communist Party.

It is perhaps notable that J. Edgar Hoover, director of the Federal Bureau of Investigation, expressed "grave doubts as to the wisdom of such legislation."

Rep. Karl E. Mundt, ranking Republican member of the House Committee on Un-American Acto sell tivities has also declared that he sheets. does not favor such a law at the

present time because his group and the FBI were obtaining valuable information by infiltrating into the party.

Nationwide surveys already reported on the same issue:

'In general do you think most American citizens who belong to the Communist Party in this country are loyal to America or to Russia?"

												Pct
Loyal to	Ameri	C	3		۰							18
Loyal to	Russia				*				*		*	61
No opini	ion											21

"Should American citizens who are members of the Communist Party be forbidden to hold Civil Service jobs (regular gov-ernment jobs) or should they have the same rights as others to hold government jobs?"

Should be forbidde	n								Pct
Hold gov't jobs									67
Should be allowed Hold gov't jobs									19
No opinion									14

• • • With Henry A. Wallace in the headlines both here and in Europe, questions have arisen as to the size of his following as a political leader.

Mr. Wallace has for 2 years been second only to President Truman in popularity among Democratic voters as a candidate for 1948. But during the last 5 months his popularity in that respect has declined sharply.

Latest results from interviewing Democratic voters, during the period April 12 to 20, show that about one in ten of those with opinions would like to see him become the Democratic presidential candidate in 1948. This is less than half the vote he polled in a similar survey last December, when 24 pct said Mr. Wallace was their choice for the next nomination.

The top choice of Democratic voters continues to be Mr. Truman. His percentage has risen sharply since December.

The following table shows the

"If you had to decide today, who would be your choice for president in 1948?"

Democratic Voters Only May Mar. '46 Dec. '47 Today

Pct Pct Pct Pct Truman 61 48 69 79

Public Favors Ban on Reds Holding U.S. Government Jobs; Wallace's Popularity Falling

Wallace	. 24	24	13	9
Eisenhower		8	7	5
Byrnes	. 3	10	2	- 1
Marshall	- de	*	4	1
Others	. 8	10	5	5

A total of 22 pct said they had no definite choice in mind at this

The trend figures indicate that Mr. Wallace's position in the party in relation to Mr. Truman was strongest last December, just after the November Congressional elections which proved a setback to the Truman administration. The President's popularity as a 1948 candidate fell to 48 pct of those expressing a choice, while Mr. Wallace remained as popular as he had been some months before the

In 1944, although Democratic party leaders bypassed Mr. Wallace in picking their vice-presidential candidate, he was the topchoice of the rank and file of voters in the Democratic party for

As the institute reported at the time, Mr. Wallace led by a better than 4-to-1 majority over the next most popular figure as a possible vice-presidential candidate, Alben W. Barkley, Harry S. Truman ranked seventh in popularity in a list of eight.

Mr. Wallace's ideas on foreign policy have not been popular with the general voting population. Last October he publicly disagreed with the policy toward Russia then being followed by James F. Byrnes, Secretary of State. A nationwide poll by the institute found that among the people who said they had followed the discussion over the Wallace-Byrnes controversy, the overwhelming majority said they favored the ideas of Mr. Byrnes rather than of Mr. Wallace.

Reports Breakdown Of Steel To Be Given To Freight Car Builders

Washington

• • • A product breakdown of the 210,063 tons of steel which the steel industry will supply to freight car builders during July and August was revealed by the Office of Defense Transportation last week. This tonnage to be provided in each of the months is expected to provide sufficient steel to insure production of 10,000 new freight cars beginning in July, as well as the steel needed for freight car repairs.

At the same time, ODT revealed that several new companies had agreed to participate in the program in addition to those reported in THE IRON AGE, Mar. 6, p. 119. These companies are the Continental Steel Co., Sharon Steel Co., Acme Steel Co., Geneva Steel Co., National Supply (Spang - Chalfant), Mercer Tube & Mfg Co., Wheatland Tube Co., and the Pittsburgh Steel Co. Also included are several small miscellaneous forge companies.

Reversing an earlier position, ODT Director J. M. Johnson has stated that "although the Steel Industry Committee cut our request by about 29,000 tons per month my staff is of the opinion that the 10,000 car program can be reached together with an effective car-repair program. This belief stems partially from the expectation that the quantities agreed to by the steel companies are minimum and will actually be exceeded by deliveries.'

Mr. Johnson pointed out that tonnages of car steel in excess of the requirements for the original 7000 car monthly program have been rolled during April and will continue during May and June. He also stated that the car builders schedule of Mar. 12 indicates that the builders aim to accelerate their fabrication processes beyond the 7000 car rate immediately so that the 10,000 car level of production would be practically attained in June and continued through August at least.

The total tonnage of 210,063 tons shown on the steel industry committee's distribution sheet, as revealed by ODT, was divided be tween new car requirements and MRO requirements approximately as follows:

	Cars	and Repair	Total
Billets	1,835		1,835
Shapes	41,610	7,000	48,610
Plates	50,340	25,460	75,800
Bars	13,320	17,000	30,320
Pipe	1.080	2,900	3,980
Sheet & Strip*	23,700	5,400	29,100
Axles			16,123
Miscellaneous Forg- ings	3,055	1,240	4,295

^{*}The 6000 tons of galvanized sheet under-written by the steel companies was not divided between new cars and MRO.

Reports Railroads Had 87,080 Freight Cars On Order on Apr. 1

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Washington

• • • Class I railroads on Apr. 1 had 87,080 new freight cars on order, according to the Assn. of American Railroads. On the same date last year, they had 40,217 on order and on Mar. 1 this year, there were 75,358.

New freight cars on order on Apr. 1 included: 26,309 hopper, 6532 gondolas, 1058 flat, 9351 refrigerator, 550 stock, 318 miscellaneous freight cars and 42,962 box.

Class I railroads also had 640 locomotives on order on Apr. 1, compared with 494 on the same day in 1946. The number on order on Apr. 1, included 52 steam, 6 electric and 582 Diesel locomotives.

These railroads put 7249 new freight cars in service in the first quarter of this year, of which 3017 were installed in March. New freight cars put in service in the first quarter of 1946 totaled 8006.

They also put 220 new locomotives in service in the first 3 months of 1947 of which 24 were steam, and 196 were Diesel. New locomotives installed the same period last year totaled 31 of which 20 were steam and 11 were Diesel.

Blaw-Knox Quarterly Net Totals \$773.522

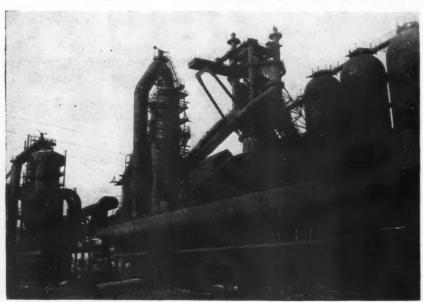
Pittsburgh

• • • Blaw-Knox Co. reported earnings for the quarter ended Mar. 31, 1947, of \$773,522. This was after provisions for taxes and charges, and compares with a net of \$28,926 reported for the first quarter of 1946. The 1946 first quarter earnings included \$450,-000 transferred from reserve created in prior years for war and postwar adjustments.

Shipments and services billed in the first quarter of 1947 amounted to \$11,694,320, compared to \$9,067,-852 for the same period of 1946. Unlike the prior year, the 1947 billings included no war business.

At the annual meeting held Apr. 16, William P. Witherow, president, reported that unfilled orders at the end of the first quarter amounted to \$32 million. largest and most diversified backlog in the company's peacetime history.

PRIDE OF THE URALS: This is one of the blast furnaces the Russians built in the Urals during the war. It is at the Chussovoye iron and steel works in the Molotov region, where the area's first duplex openhearth shop is located.



Steel Exporters See No Sharp Gains Soon; Flay License System

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• • • Until domestic steel demand becomes a great deal easier than it is today American steel exporters refuse to make any optimistic predictions on sales for the immediate future. Great Britain would still like to buy a whopping tonnage of semi-finished steel but those who would normally be able to supply it are not yet in a position to say when it can be shipped.

Some products are reported easier: Wire rope, tool steel and stainless steel, as one might expect from the somewhat easier domestic demand for these items. On other products the prospects are little changed from what they

were late last year.

It is still too early to estimate the effect of price increases made in December 1946 and early January 1947, steel company export men declared. But it is admitted in other circles that a fair proportion of fantastically high-priced steel products have found their way into the export market. "I refuse," a European buyer fumed, "to pay 15¢ per lb for a thousand tons of barbed wire." He had, he said, paid about double the domestic price for a few other items but most of the prices asked were impossible.

Export licenses are still in a muddle in Washington, according to steel export houses. The steel company export offices received their second quarter licenses during the second week in April; some of the export firms didn't get theirs until the fourth week in April. The results were confusing for those of the latter group who had steel to ship and no license to cover it. Horse trading solved the problem for some; they sold their steel to export houses which had licenses left over from the previous quarter.

Again, exporters are complaining that second quarter allocations were drastically cut to an average of 10 pct of the original license application. On some products the Office of International Trade of the Dept. of Commerce slashed licenses to only 5 pct of the amount originally requested. Even at this rate it is anticipated

that some export houses will not have any steel to ship on their own account and will trade with the fortunate few companies who have actually secured steel.

No immediate concern was felt by steel export men over the report that Argentina would construct a \$100 million steel plant. It was pointed out that several years would be required before it could be in operation. And unless the Peron Government is willing to absorb at least half the plant's cost it is not likely to be competitive in world markets despite somewhat lower wage rates. Steel company officials say that a steel plant built today would cost two or three times what it would have cost before the war. High capitalization, according to Brazilian steel officials, is the No. 1 problem in Brazilian steel prices.

Forecasts Construction Activity for Nation In 1947 at \$19 Billion

Washington

• • • Revising downward its estimate of 4 months ago, the Commerce Dept. has forecast the total of all construction activities of the nation for 1947 at between \$18.3 billion and \$19.6 billion.

In late December, the Department estimated the current year's construction at \$21.6 billion. Both forecasts include an estimated \$6.5 billion for maintenance and repair construction.

The downward revision, the Department explains, has been brought about chiefly because of

less than expected total construction in the first quarter, the falling behind of residential construction, and failure of building to show the seasonal spring recovery. These are largely attributed to not only appreciably increased costs but uncertainty as to future prices and similar trends.

These unfavorable factors are partially offset, it was said, by the continued high rate of output of building materials and actual increases in some construction.

At the present indicated rate, the million starts and 900,000 completions in residential units estimated as of the first of the year will have to be revised to 800,000 starts and 720,000 completions.

WINGED JEEP: Jeeps have covered thousands of miles by plane but this is a new angle. A tandem helicopter built by Piasecki Helicopter Corp., Sharon Hill, Pa., is hauling this one-ton load to demonstrate the carrying capacity of the new XHRP-1 with twin rotors powered by a 600-hp Pratt & Whitney engine.



Vehicular Springing Starts Lively Discussion at SAE Meeting

Chicago

• • • Spring was busting out all over Chicago but on the afternoon of Apr. 17, the most novel focal point centered around the truck and bus section on torsional suspensions at the SAE national transportation meeting held in the Stevens. The 600 members took the season literally with three papers on different types of spring suspensions. No punches were pulled in the discussion of the merits of rubber versus steel or bar versus leaf. Latest army ordnance use of spring suspensions was presented and the various enthusiasts of the different systems agreed on but three points -springing can be difficult, each application may be a case in itself and there is an awful lot to yet be learned about suspension systems.

The first paper presented by N. E. Bateson, project engineer of General American Aerocoach Co., advocated replacing leaf springs with torsion bars, "Problems in Commercial-Vehicle Suspensions and Their Elimination by Torsion Bars." His comments were much to the discomfort and later strong objection of Hendrickson former vice president, Mather Spring Co., who was representing the Leaf Spring Institute. F. R. Fageol, chairman of the board, Twin Coach Co., disallowed the use of steel entirely, be it a leaf

Proponents of Various Types
Bounce Up and Down In
A Spirited Session

By D. I. BROWN
Chicago Regional Editor

or a bar, and presented the advantages of "a rubber torsilastic suspension system." Mr. Fageol praised the no squeak, no rattle, no bump properties of rubber and showed the construction details of such suspension.

Neither side of the steel spring argument found solace or definite support in Col. J. M. Colby's talk concerning suspension in heavy military vehicles. The colonel advocated the use of both torsion bar and volute spring where a combination system increased the shock absorbing ability of ordnance vehicles nine times over that of the old bogey wheel arrangement. Although the chairman or arbitrator of the session. M. C. Horine, sales promotion manager, Mack Mfg. Corp., was pledged to neutrality, he couldn't resist the temptation and added his opinion by commenting on Mr. Hendrickson's strong attack on torsion bar springs.

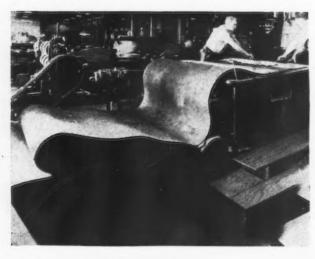
Mr. Bateson opened his talk by

saying the first requisite in the design of a commercial vehicle is the comfort of the passengers. He recalled the theory that through the ages, the average human has become accustomed to walking three miles per hour with a 30-in. step. Our organs are therefore accustomed to this frequency and any greater oscillation causes discomfort. He showed that ordinary walking produces 105 oscillations per minute and that most pleasure car suspensions have a design frequency of 70 to 90 oscillations per min, or well under the discomfort point.

Turning to a spring the speaker considered the factors which cause a spring to vibrate and concluded that the "spring period" is dependent on static deflection and not the type of design or material used. The effect, upon ride, of the ratio of unsprung to sprung weight was stressed. The torsion bar has done much to reduce unsprung weight by removing the spring from the axle. Graphs and diagrams of spring deflection and torsion bar linkage were presented along with drawings comparing the riding characteristics of different suspension systems. As an example of ride stability the speaker said, "An experimental cruiser type bus built by my company and equipped with torsion bars, could make a 90 degree turn at more than 50 mph with all six tires sliding, on dry concrete, without any appreciable roll. Together with this it was possible to sit on the rear seat overhanging the rear axle and drink coffee without spilling it at more than 70 mph."

Spring geometry and driver fatigue was discussed and the life and maintenance of springs were compared. The speaker showed that at low stress a spring could have almost infinite life but as stress is increased the life shortens abruptly.

For long life the speaker showed the leaf springs must be made heavy. One example cited the weight of a leaf spring for a given set of conditions which would have to weigh over 300 lb, while torsion bars to do the same



STEER IN A STEEL MILL: Nearly 200 steers laid down their hides that this 72-in. wide leather belt might come to be. The 106-ft Vim leather belt is being repaired in E. F. Houghton & Co.'s Philadelphia plant after years of steel mill service.

110-THE IRON AGE, May 1, 1947

job would weigh 40 lb. At this point in the talk, Mr. Hendrickson began to fidget and as soon as the discussion opened he rushed to the stage and promptly began to challenge Mr. Bateson's statements. Mr. Hendrickson recalled that dual or triple leaf spring systems can be used-which he said Mr. Bateson had overlooked. He cited the expensive materials needed for torsion bars-Magnaflux quality, centerless ground, etc. His defense of leaf springs well accepted, with the audience obviously enjoying the contest. Mr. Fageol then took over and intimated that the previous arguments were interesting but not apropo as steel is not the best material to use for springs. He said that Twin Coach had settled on rubber because it was "most flexible, elastic, mobile, inert matter known today." Further, rubber has no initial friction, it is forever silent, will last forever if flexed within its well known fatigue limits. Rubber can't rust, requires no lubrication and has ability to absorb the smallest shock plus "every degree of shock from there on up."

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This speaker recalled that the best alloy steel has fatigue limits too low to be suitable for the wide ranges of load and shock a spring must absorb. "It will either be a good ride under light load, or a good ride under heavy load, but not both and therefore such suspensions are compromised in either direction."

His company believes that either synthetic or natural rubber comes closest to meeting the wide requirements of spring material. He reviewed the well known limitations of rubber in tension and compression and told why a shear rubber unit was best for basic reasons. The present alloy steel spring was said to have an average life of 75,000 miles in bus application and Mr. Fageol said their present goal was a spring life of 300,000 to 500,000 miles.

Use of rubber by Twin Coach in their suspension system was described. The spring itself consists of an inner tubular member approximately 3 in. in diam and about 60 in. long. Surrounding this member and co-axial to it is an outer shell approximately 5 in. in diam and about 50 in. long, so placed that the extreme ends

of the inner member extend beyond this shell for applying a lever. The extruded aluminum outer shell is split axially in two pieces. Between these two pieces rubber is vulcanized the full length to both the outer surfaces of the inner tube and the inner surface of the outer shell. The aforementioned levers are welded to the inner tube and form part of the 10-in. arm assembly. This unit is used identically on each corner of the vehicle.

Two of these units are bolted parallel to each other on the axle housing or beam in the position normally applied by a leaf spring, the fastening being made to the outer shell of the spring unit. Working from a position standing directly over the axle and facing the forward end of the vehicle, the levers previously mentioned are located outwardly toward the body side at the front and rear ends of the spring unit. The outer end of the lever is connected by means of a rubber shackle also working in shear to the body structure at a point approximately in line with the center of the wheel. A provision is made in the lever for minor angular adjustment to take care of the changes in vehicle height and a slight initial set of the rubber. This application permits the use of conventional axles with very slight modification.

The method of suspending or

hanging the body by rubber shackles from the lever arm gives certain amount of lateral cushioning, which divorces direct load shock from the body and by nature of geometry enables the body to tilt slightly inward on a curve, as opposed to conventional systems which have the opposite effect. The use of rubber in the shackles themselves give an appreciable amount of fore and aft cushioning which means, in the case of hitting a severe hole or rail crossing, the axles can actually float slightly dissipating the shock loads.

The speaker said that the physical stable characteristics of the rubber system will not change with age. He went on "This is, of course, not true of conventional leaf spring systems, which due to inner leaf galling action and rusting, become increasingly stiffer with age by building up the initial friction between the leafs. In summing up the speaker said, "I believe it is apparent that in applying the rubber torsilastic unit to this suspension system we have accomplished the objective set forth earlier in the paper. We have utilized the best known practical elastic material, and as a result rubber cushioned the entire vehicle. The vehicle and suspension permits the chassis to float without losing the feel of the vehicle. Resistance to swaying or rolling of the vehicle is greater

STAIRWAYS TO THE SKY: Three huge housing projects in New York City will use 3290 of these light weight all steel stairs. Each of the stairs is made of Jones & Laughlin Junior channels and Jaltread floor plate. The stairs are being put into immediate service as the apartment buildings go up to house 70,000 people.



than for any other suspension with the same spring rate without special means to prevent it."

Whether Mr. Fageol's caused Messrs. Bateson and Hendrickson to arbitrate their differences in order to better defend the use of steels, could not be determined at the meeting. The numerous representatives of the rubber industry in attendance chose not to press the point, although L. C. Lindblom of B. F. Goodrich Co., did remark on Mr. Bateson's paper. He agreed with Mr. Bateson's analysis that the inner leaf friction of leaf springs contribute to "boulevard thump" which many car owners have experienced and do not understand. Mr. Bateson's formulas explained the phenomenon very well but the mathematics involved were confusing to those not familiar with the engineering of the spring.

The final talk by Col. Colby concentrated on military vehicles where ride requirements are somewhat different. In fact, the difference between Mr. Bateson's problem of spilling a cup of coffee in the back seat of a bus doing 70 mph and Col. Colby's worry about the tanks "coming up and

hitting you in the face" defied precise correlation.

The colonel covered the Army's use of torsion bars which started around 1933. Lack of funds made the Army drop the plan prior to the war. Torsion bars were finally widely adopted after the initial large demand for ordnance vehicles were met during the war. Prior to their wide adoption the torsion bar turned up on certain captured German equipment, a fact which the colonel did not mention. Very excellent comparisons of riding qualities were shown in graph form by this speaker, comparing torsion bars versus ordinary steel springs. The Army has utilized both leaf and torsion bar suspensions in combination and latest designs are much improved over the last wartime product. Col. Colby said that the space saving inside military vehicles was one reason the Army used torsion bars. The colonel did not elaborate on the use of a complete rubber suspension system. Previously, Mr. Fageol had cited the use of the giant size torsilastic springs used in "water buffaloes," "alligators," "beach busters" and other military vehicles during the war.

Amendment Would Help Small Business Expand

Washington

• • • Sen. Pat McCarran (D-Nev) will propose an amendment to the pending tax legislation which would permit business to plow back into expansion, machinery and equipment substantial amounts of each year's profits and exempt from taxation the profits so used.

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Because the amendment would limit such exemption to \$125,000 or 50 pct of the business net income (whichever is less) its chief benefit would be to small business, its frank purpose.

Under the present tax set-up, new plant, machinery or equipment expenses are not deductible expenses in the year made. They must be written off over a number of years according to the life of the property.

The present tax rate ranges upward from 21 pct to 38 pct on profits of less than \$50,000 and 38 pct on profits over that figure.

"If any reasonable distribution is made in the form of dividends," Senator McCarran said, "there is very little left over to invest. Under these conditions, it is almost impossible for a man to build a business."

Coming Events

May 5-6 National Welding Supply Assn., convention, Philadelphia.

May 12-15 American Steel Warehouse Assn., annual meeting, Los Angeles.

May 15-17 Society for Experimental Stress Analysis, annual meeting, Chicago.

May 20-21 International Acetylene Assn., annual convention, Cincinnati.

May 21-22 American Iron & Steel Institute, annual meeting, New York.

May 26-27 Assn. of Iron & Steel Engineers, annual spring conference, Philadelphia.

May 27 Metal Powder Assn., spring meeting, New York.

June 2-4 American Gear Manufacturers, Hot Springs, Va.

June 5-7 Electric Metal Makers Guild, Inc., annual meeting, Pittsburgh.

June 9-11 American Coke & Chemical Institute, annual meeting, French Lick, Ind.

June 15-19 American Society of Mechanical Engineers, semiannual meeting, Chicago.

June 16-20 American Society for Testing Materials, annual meeting, Atlantic City, N. J.

June 17-19 Machinery Dealers National Assn., convention, Cincinnati.

June 23-27 American Electroplaters Society, industrial finishing show, Detroit.

July 14-18 American Society of Civil Engineers, Duluth, Minn.

Aug. 25-29 National Assn. of Power Engineers, Inc., Boston.

Sept. 8-12 Instrument Society of America, conference, Chicago.

Sept. 10-12 Porcelain Enamel Institute, Inc., Columbus, Ohio.

Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Chicago.

Sept. 29-Oct. 3 American Gas Assn., San Francisco.

Aids Texas City Employees

Texas City, Tex.

• • • As an aftermath to the Texas disaster resulting from a ship explosion that touched off the Monsanto plant, employees of that organization are expressing their reaction with donations and offers of help. Monsanto plants at Oak Ridge, Tenn., Trenton, Mich., Seattle, Wash., Anniston, Ala., and St. Louis, immediately sent word to temporary headquarters in Galveston that donations were being taken to aid fellow employees and their families who were victims of the tragedy.

On Apr. 19, William M. Rand, president of Monsanto, notified all plants, foreign and domestic, that "commencing at noon today, you are requested to fly all flags at half mast for a period of 30 days. This is being done in respect to the memory of our men and women who lost their lives in the Texas City plant."

The London ECONOMIST

Mr. Henry Wallace

R. HENRY WALLACE has come to Europe in search of progressives, and according to him a progressive is a "person who believes the future is more important than the past." If he sticks to this definition he will not need to look very far; in that sense we are all progressives now.

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But other things he has said, in the course of two broadcasts and three public meetings-all under progressive auspices-suggest that his definition is incomplete. The progressives he is looking for are the people who turn their backs on the present and occasionally take a short and painful look at it from between their legs. Most politicians and public men reaching middle-age find the posture increasingly uncomfortable, and end by turning their backs on the future; but not Mr. Wallace. After 14 years of politics he remains supple, hopeful, indignant, and broad of vision. Perhaps because he is also a farmer and a scientist, because he wants power but could at a pinch live without it-in other words because he is the imperfect politician.

The risk created by his present visit is that many people in Europe -progressives and others-will overestimate his power in their admiration for his quality. They may repeat the error they made-with more excuse-with Wilson 30 years ago, and mistake the idealist American for American idealism. They may be tempted to see in Mr. Wallace a candidate for leadership of the Democratic Party, who hopes to return to the United States and feels himself propelled to power by the ardent breath of progressives outside his own country.

Then—they may think—he would reverse present American foreign policy, seek to bring Russia into international partnership for the reconstruction of Europe, and repel communism everywhere by a united effort to raise world standards of living.

This is no unfair simplification of what Mr. Wallace is describing as his "international new deal." And if he is not serious, if he does not intend to organize power behind the idea, why has he come to Europe to spread it? Not, surely, just to blow on the embers of the Socialist revolt against Mr. Bevin's foreign policy, or on the feeble flames of European opposition to Mr. Truman's anti-Communist doctrine—or to study the art of editing a progressive periodical.

M. Wallace's speeches are clearly intended to be read in America. They are intended to shake American—and European—confidence in Truman's challenge to Communist conspiracy against governments outside the Soviet sphere of influence. It is important that the countries next visited by Wallace should understand not only this, but also that the editor of the New Republic and the successful experimenter with Rhode Island Reds does not represent a body of American opinion either massive or organized.

As the last hope of the New Dealers—or, more accurately of one section of the New Dealers—he represents the vague aspirations of many Americans for peace and security and friendliness in the world, but nothing more. It is good that he does, for such voices should always be heard in this country with respect, and have always been so heard, so long as the facts were not overwhelmingly against them.

But the facts of the moment are overwhelmingly against Wallace's practical proposals. This can easily be seen from one or two he has propounded during the last 10 days. To begin with the most actual problem of all, the Moscow Conference -how would Wallace deal with this indecisive debate about Germany? He would make it succeed, he said in London last week, "by starting an overall program for the reconstruction of Europe." An excellent idea; but is it not precisely because the Russians want to use German industry for their own reconstruction before it is used for European reconstruction that the conference is failing?

Nine months ago, before the Mos-

Reprinted by special permission to further understanding on how political and economic affairs are viewed in London.

cow Conference was thought of, they refused to attend the London conference of the United Nations Sub-Committee on Devastated Areas. This modest body was engaged in nothing more harmful than a survey of what reconstruction there was to be done in Europe. Out of it emerged much useful information and the fruitful suggestion of an Economic Commission for Europe. It received hearty American and British support; the Czech and Polish observers could have told Moscow how hearty it was and how easily the commission might be an inducement to American loans and gifts to Europe.

What happened? The Soviet delegate in the Social and Economic Council fought the proposal tooth and nail until his colleagues from eastern Europe convinced him of the dangers of doing so. Then he withdrew opposition, but refused to vote on the commission's terms of reference. The example is chosen because it shows Russian intransigence at a low, working level of international cooperation, where diplomatic risks were few.

Much of the same has happened over other attempts to make a common approach to the joint effort that Wallace advocates: The conference on a world trade organization, the allocation of European coal supplies, the world food conferences. And the Russian refusal to take part in them dates back to a time when Mr. Byrnes was still being accused of trying to secure an agreement with Russia even, if need be, at British expense, when Wallace was denouncing from New York the imperialism he saw in London, and when Britain was taking alone all the knocks in Indo-

(CONTINUED ON PAGE 150)

Urges Restoration Of Free Markets to Get British Production Up

London

• • • Oliver Lyttelton, M. P., in, a recent address on "Production" at a Royal Society of Arts meeting in London, said that one of the most useful things that could be done to get production flowing evenly would

be the restoration of free markets and of the price mechanism in the purchase of raw materials.

He said that there was no greater fallacy than to imagine that priority systems could be worked on a detailed, scientific basis. They never worked in war, where the government itself bought most of Britain's production, and in peace when the demand for what Americans call the "end product" was unknown, the task of planning pri-

orities was beyond human calculation.

Regarding the problem of labor shortages, he felt that the most important approach on the subject was to see that every worker understood the gravity of the economic crisis now overshadowing Britain. The fact that a higher standard of life cannot be secured without higher productivity could not be over-emphasized. Incentives should be given for greater productivity, and those who worked or adventured above the average should have above the average reward.

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Mr. Lyttelton went on to say that above all the worker must feel that he was being fairly treated. that the employer's approach on organization and layout was determined and successful, that his wellbeing had been cared for, that time and motion study was designed to reduce his fatigue and give him higher rewards. But he must be made to realize that "we could not take out of the common pool more than was put into it, and that there was a standard of service to the community by the worker as there must be by the employer.'

Canadian Steel Production and Shipments

Toronto

• • • Canadian production and producers' shipments of primary iron and steel shapes for the month of January registered a sharp gain over the month immediately preceding as well as for January, 1946. During January Canadian steel mills produced 267,511 net tons of primary shapes and shipped 268,313 net tons as compared with 243,791 tons made and 228,981 tons shipped in December and with 246,743 tons made and 243,245 tons shipped in January, 1946. The following table presents production and shipments of primary iron and steel shapes for the month of January in net tons:

	Carbon	n Steel	Alloy Steel		
January, 1947	Made	Made Shipped		Shipped	
illets, etc., for forging	7,183	7,056	761	638	
ther semi-finished shapes not for rerolling by makers.	29.801	42,617	182	181	
tructural shapes and piling	17,254	15,613			
lates	18,596	18,163	*****		
ails	18,618	20,029			
ie plates and track material:	10,010	20,020			
Splice bars	1.120	502			
Tie plates	4.707	4,524			
Spikes	1.252	1,143			
ool steel	225	228	645	331	
lot rolled bars for forging.					
oncrete reinforcing bars	8,523	7.287			
lot rolled bars for cold finishing	1.185	1,066			
ther hot rolled bars	44,588	41.660	6.067	4,492	
ipes and tubes	10,326	12,406			
Vire rods	25,809	24,210	23	10	
lot rolled black sheets	20,734	19,684			
old reduced black sheets	2.219	2,219			
alvanized sheets	7,297	6.342			
teel castings—By ingot makers	1,274	1,249	59	51	
-By other foundries.	3,309	3,376	1,456	1,350	
If other shapes including tin plate, tin mill, black plate,				1	
cold finished bars and strips, etc	34,040	31,740	258	146	
TOTAL PRODUCTION	258,060	261.114	9,451	7,199	

Producers' shipments of primary iron and steel shapes, subdivided according to principal consuming industries for January, in net tons follow:

Industry	Carbon Steel	Alloy Steel
Automotive industries Agricultural, including farm machinery Building construction	6,034 8,212 29,318	3,269 108 42
Containers industry Machinery and tools	14,679 13,586	9 693
Merchant trade products. Mining, lumbering, etc	24,379 6,496	62 631
National defense	82 11,100	71
Public works and utilities	1,114 22,002	53 263
Railway cars and locomotives. Shipbuilding. Miscellaneous and unclassified	3,793 5,484	27 24 72
Wholesalers and warehouses	997 29,232 55,880	72 271 171
Producers interchange. Direct export—To British Empire. To other countries	19,627 9,099	172 1,259
TOTAL SHIPMENTS	261,114	7,199

British to Get Machinery

London

• • • Britain is hoping to see an increase of at least 50 pct in its output of stripmined coal with the aid of American excavating machinery. It is reported that a British mission has recently arranged to buy from America \$15 million of earth-moving machinery, about two thirds of which is expected to be allocated to strip mining operations. The annual output should thereby be increased from its present average of 9 million long tons to about 15 million tons.

The first shipments of the machinery should reach Britian next autumn, and subsequent consignments are expected to arrive until the spring of 1949.

Import Aluminum Scrap

London

• • • • The British Minister of Supply announced recently that, with the agreement of the President of the Board of Trade, imports of aluminum scrap and aluminum alloy scrap into Britain will now be allowed. All imports will be subject to individual licensing.

Navy Will Use 20,000 Tons of Sheet Steel to Can Surplus Aircraft

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• • • The Navy will begin "canning" more than 2000 surplus carrier and trainer aircraft in June under a long-term storage program designed to preserve the planes in a near fly-away condition for a period up to 5 years. A contract calling for the construction of 444 large "cans" requiring more than 20,000 tons of 14-gage corrugated steel has been let to the Youngstown Steel Door Co.

Two containers of different sizes will be constructed. One container is 19 ft wide and 140 ft long weighing approximately 110,000 lb, while the other is 24 ft wide and 130 ft long weighing about 100,000 lb. Both are 17½ ft high. They will be constructed from 10-ft corrugated steel panels. Each panel has welded flanges on the vertical edges pre-drilled for bolts to facilitate assembly and bolting together.

The first type, of which 268 will be built, will be used to house Hellcats, Corsairs, or Seahawks. while the 176 of the second type Will Maintain 2000 Carrier Planes in Near Fly-Away Shape in 444 Huts

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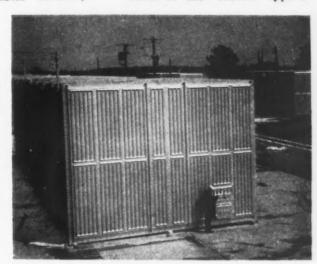
will be used for Avengers and Helldivers. The containers will hold varying numbers of planes, from 3 up.

Like sprayed plastic "cocoons,"

both processes involve controlling the relative humidity of air within the storage area, but the "cocoons" are not completely satisfactory in areas subject to seasonal windstorms. In addition, the rigid containers can be used more than once and provide space for storage of aeronautical equipment along with the planes.

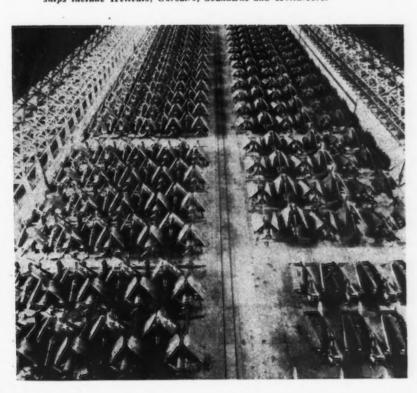
Tests of the "cocoon" type of

STEEL CELLS:
This is the type of corrugated steel cell the Navy has contracted to buy for its 2000-plane storage program which will get under way this summer. Moisture content of the air within the cell will be maintained at a 30-degree relative humidity level with specialinstrumentation and vaportight doors.



TO BE CANNED: This summer the Navy will put some 2000 war surplus carrier type airplanes in metal cells to keep them for use during the next 5 years. At the moment they are stored in places like this blimp hangar at Weeksville, N. C. The ships include Hellcats, Corsairs, Seahawks and Helldivers.

Official U. S. Navy photographs



preservation are being continued, however, as the possible solution to the problem of storing larger types of aircraft, since metal containers cannot be procured in larger sizes at a reasonable cost.

Under the canned storage program, a total of 2020 late model planes valued at more than \$150 million will be preserved at six bases scattered throughout the country.

Vapor-tight access doors are provided in each cell to permit entry for airplane inspection. Glass windows located in strategic spots allow easy reading of five instruments which record interior temperature and relative humidity in different portions of the container.

More than 4,000 aircraft are now in interim storage in the Navy. Of these, the 2020 will go into "cans" and the remainder will be gradually absorbed as replacements for aircraft in service.

Long Term Peace Seen In Steel Industry By Labor, Management

New York

• • • The Steel Corp.-United Steelworkers wage contract means real peace in the industry for a long time—both sides believe this. This pact is different than others in the past. There was no government interference and representatives of the company and the union were well known and understood by each other.

There was a spirit noted this year that was not present in years gone by—complete confidence between head negotiators. John A. Stephens, U. S. Steel Corp. of Del. vice president in charge of industrial relations sincerely believes that wage contracts must have other ingredients in them besides words. This is no pose on his part—that is why the union takes his word at its face value.

That is why the following paragraphs are in the new contract.

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".... The company and the union encourage the highest possible degree of friendly, cooperative relationships between their respective representatives at all levels and with and between all employees. The officers of the company and the union realize that this goal depends on more than words in a labor agreement, that it depends primarily on attitudes between people in their respective organizations and at all levels of responsibility. They believe that proper attitudes must be based on full understanding of and regard for the respective rights and responsibilities of both the company and the union. They believe also that proper attitudes are of major importance in the local plant where day-to-day operations and administration of the labor agreement demand fairness and understanding. They believe that these attitudes can be encouraged best when it is made clear that company and union officials, whose duties involved negotiation of this labor Agreement, are not anti-union on anti-company, but are sincerely concerned with the best interests and well-being of the business and all employees.

"Accordingly, the company and the union as evidence of attitude and intent, have agreed that during the life of this agreement officials of their respective organizations should meet on the third Tuesday of each month from date of this agreement in the city of Pittsburgh, Pa. The purpose of such meetings is understood to be an appraisal of the problems, if any, which have arisen in the application, administration and interpretation of this agreement and which may be interfering with the attainment of their joint objective as set forth above. Such meetings shall not be for the purpose of conducting continuing collective bargaining negotiations, nor to in any way modify, add to, or detract from the provisions of this agree-

"By such an agreement the parties are affording concrete evidence of a sincere attempt to accomplish the goal of cooperative good industrial relations and of their purpose to find ways to overcome difficulties or influences interfering with the attainment of their goal...."

GRAND FINALE: Looking over the shoulders of Charles R. Cox, Carnegie-Illinois Steel Corp. president, and Philip Murray, USWA president, (left to right) is John A. Stephens, U. S. Steel Corp. of Del. vice-president, head man for the firm in sweating out the new agreement signed last week. To him the most important part of the contract is included in the accompanying story. In the picture below, the man standing by the door with the cigarette is Erik Ferguson, assistant public relations director for the steel firm at Pittsburgh. Looking over the signing is Vin Sweeney (with hat), union press relations man.





116-THE IRON AGE, May 1, 1947

CPA Predicts a 5000-Ton Antimony Shortage This Year

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ereir • • • Antimony supply may be 5000 tons short of requirements this year, despite a probable increase in domestic production, according to the Civilian Production Administration.

Consumption of primary and secondary antimony in the United States during 1946 amounted to 37,378 short tons, the agency reported. This exceeded the supply by about 8000 tons which was made up by withdrawals from government stocks which are now down to less than 5000 tons.

As of Jan. 1, there was in private stocks 9235 tons, and 4632 tons in government stocks, a total of 13,917 tons, exclusive of 2856 tons of scrap; on the same basis as 1946, new supplies are seen as about 18,686 tons—10,188 from domestic production and 8498 by importation—leaving a deficit of 4775 tons after RFC stocks are exhausted.

Since 1946 was a year in which consumption was not affected by war production, it has been accepted by CPA as a definite pattern for 1947 and until demand for goods in short supply has been satisfied. Efficient use, careful distribution of the remaining government stocks, and a maximum recovery of antimony from scrap must be effected, CPA said.

DOMESTIC ANTIMONY	
CONSUMPTION-1946	
(Short tons)	
PRIMARY	
Bearings	2,887
Type Metal	1,903
Solder	288
Collapsible Tubes and Foil	122
Antimonial Lead	6,469
	11,669
Frits and Ceramic Enamels	1,815
Paints	1,664
Sodium Antimonate	1,359
Glass and Pottery	351
Antimony Trichloride	106
Flame Proofing Compounds	98
Matches	24
Ammunition Primers	15
Rubber	12
Miscellaneous	414
	5,858
Total Primary	17,527
SECONDARY	19,85

Loss of Most Bolivian Imports Is Major Cause Despite Better Home Output

Last year's sharp drop from 1945 levels was caused largely by the loss of Bolivia as a major source of imports. In addition to a postwar drop in production, Bolivia has now become the chief source of supply for European countries which were

not competitors during the war.

(Short tons of Sb		
(3007 1003 01 35	Jan. 1,	Jan. 1,
GOVERNMENT	1946	1947
Ore	7,592	1,703
Metal	2,554	2,929
Total	10,146	4,632
PRIVATE		
Ore	7,610	5,259
Metal	1,638	1,975
Sulfide	198	84
Oxide	2,366	1,967
Total	11,812	9,235
Total Primary	21,958	13,917
Scrap	2,547	2,856

Imports from Bolivia dropped from nearly 15,000 tons in 1945 to less than 1000 in 1946.

There has been a decrease over the same period of more than 3000 tons from Mexico which supplied this country with 8290 tons in 1945. Purchases from the border neighbor, however, are expected to remain about the same this year as last.

Some relief was gained in 1946 through imports of 1200 tons located in China and nearly 900 found in Japan. However, the Chinese antimony industry has since broken down and since there has been no indication of new production in either country and any shipments from these areas would have to be from prewar stocks. In neither case could they be expected to be as large as in 1946.

It is hoped that part of the indicated shortage may be made up by increased domestic production and also by increased recovery of antimony from scrap.

Plant capacity in the United States for production of antimony metal, antimony oxide or other antimony products is considered by the government as ample for the present and future expected demand. The real limitation during 1947 will be the available supply of primary antimony, chiefly in the form of ores and concentrates.

Although there is a large potential demand for antimony in production of flame-proofing or flameresistent compounds, CPA forecasts no greater overall demand in 1947 than last year.

Date Set for Filing Claims

Washington

• • • Anyone wishing to file claims against enemy nationals whose property was seized by the United States prior to this year should do so not later than June 1, 1947, according to Attorney General Tom C. Clark.

Director Donald C. Cook, Office of Alien Property, said that any person may check the Index to Orders at any United States attorney's office to see whether the enemy national against whom he has a debt claim has had any property seized by the Federal Government.

United States attorneys have been supplied with the Index, claim forms, and instruction

746	1945-19	ANTIMONY SUPPLIES
	ontent)	(Short tons of Sb co
		IMPORTS
1946	1945	Ore
845	14,354	Bolivia
	45	China
8	17	Honduras
5,031	8,290	Mexico
21		Siam
**	61	Union of South Africa
5,905	22,767	
		Metal
1,720	492	China
875		Japan
**	56	Peru
2,593	548	
1,690	1,679	DOMESTIC ORES
10,188	24,994	Total Primary
19,120	17,511	DOMESTIC SCRAP
29,308	42.505	Total

Industrial Briefs . . .

- Torsion Springs—The utility two-wheel trailer manufactured by the Spencer Mfg. Co., Spencer, Ohio, employs straight bars of heat treated 4140 in torsion spring suspension. The spring runs through a tubular axle giving rugged simple construction, greater road clearance and easy ride. The trailer will not tilt or side sway due to unequal loading or centrifugal force created in rounding curves.
- ORGANIC CHEMICALS—A new regional office to handle the sale of organic chemicals, phosphates, alcohol and dry ice, has been opened by the Monsanto Chemical Co. at 140 Federal St., Boston. The office will serve as a divisional branch for the company's export sales and shipping department. Thornton Jesdale will head the staff of the new office. Financial transactions will continue to be carried on at the company's Merrimac Div. at Everett, Mass.
- BUYER'S GUIDE—Products and services of approximately 9500 Chicago area companies are listed in the 376 page "Buyers' Guide and Industrial Directory" published by the Chicago Assn of Commerce and Industry which is now being distributed. Fifty thousand copies of the twelfth annual edition are being sent to purchasing agents throughout the country. Last year 32,000 copies were printed.
- L. S. MARTZ, formerly assistant to the president of Micromatic Hone Corp., has joined the Marvin Hahn Advertising agency as account executive. The agency will move from the Boulevard Building to 41 Burroughs after May 1.
- TANTALUM Tantalum Defense Corp. of North Chicago has purchased the government owned plant from WAA. The wartime operator agreed to maintain productive capacities of the plant for national defense purposes for 7 years. The property includes about eight acres

of land and the building has a total floor space of approximately 258,000 sq ft.

- · UNLOADING PUMP-An innovation in design of hydraulic systems has been announced by the Pesco Products Div. of Borg-Warner Corp. The new "unloading" pump eliminates many pieces of equipment ordinarily required and is being manufactured at the Pesco plant in Cleveland. In the new design check valves, relief valves, unloading valves and a pressure accumulator are unnecessary with a resultant reduction in weight and cost. The pump is of hydraulic gear type and is essentially two pumps within a single housing.
- EXPORT SPRINGS—Export activities of Service Spring Co., Indianapolis, will be handled by Borg-Warner International Corp. Service Spring Co. makes springs for passenger cars and trucks and carries stock for replacement part distributors in the United States and 46 foreign countries.
- More Abrasives A new plant is being built by the Chicago Wheel & Mfg. Co. in Valparaiso, Ind. The plant will incorporate the latest design and advances in the grinding wheel industry and will manufacture the larger type of grinding wheels, a line they were forced to abandon during the war.
- WILL BUILD The Electro-Metallurgical Co., subsidiary of Union Carbide & Chemical Co., is planning to build a \$9 million plant in Ashtabula, Ohio. Actual construction of the plant is being held in abeyance but erection is expected to start some time this year.
- RESEARCH HEAD—G. H. Latham has recently been appointed president of the British Iron & Steel Research Assn. succeeding Sir James Lithgow.

American Iron & Steel Institute to Meet In New York, May 21-22

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New York

• • • The 55th general meeting of American Iron & Steel Institute will take place on May 21 at the Hotel Pierre and May 22 at the Waldorf-Astoria in New York.

At the session Wednesday, May 21 in the Hotel Pierre, Eugene G. Grace, chairman, Bethlehem Steel Co., will deliver the first Charles M. Schwab Memorial Lecture, which will be followed by an address by Wilfred Sykes, president, Inland Steel Co. Quincy Bent, vice-president, Bethlehem Steel Co., will be chairman of the morning session.

The afternoon technical session at the same hotel will be divided into four panels, which will be held concurrently. Discussions at Panel 1 will be devoted to "Raw Materials," under the chairmanship of J. L. Mauthe, vice-president The Youngstown Sheet & Tube Co. J. E. Lose, vicepresident, Carnegie-Illinois Steel Corp., will be chairman of Panel 2, covering "Coke Ovens, Blast Furnaces and Steelmaking Furnaces." Chairman of Panel 3, covering "Shaping and Forming," will be E. M. Richards, vice-president. Republic Steel Corp., and technical discussions on "General Metal-lurgy" at Panel 4 will be under the chairmanship of Hubert C. Smith, chief metallurgist, Great Lakes Steel Corp. Twenty-four technical papers will be presented at these four meetings by leading experts in the various fields

At the general session in the Waldorf-Astoria on Thursday morning, May 22, the speakers will be Walter S. Tower, president, American Iron & Steel Institute; Charles E. Wilson, president, General Electric Co.; and Edward L. Ryerson, chairman, Inland Steel Co. In the afternoon an open forum on current industrial relations problems of the industry will be held at that hotel.

The meeting will be concluded with a dinner session at the Waldorf-Astoria Thursday night. Dr. George S. Benson, president, Harding College, Searcy, Ark., will speak at the dinner session.

All sessions are limited to individual members of the institute.

Construction Steel

• • • Fabricated steel awards this week included the following:

2480 Tons, Steubenville, Ohio, blast furnace trestle for Wheeling Steel Corp. previ-ously reported fabrication awarded to American Bridge Co., Pittsburgh.

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- 1500 Tons, Atlanta, Ga., store building for Davison-Paxon Co., to Southern Steel Works Co., Birmingham, through Barge-Thompson Co., Atlanta, contractor.
- 740 Tons, Green Bay, Wis., addition to Bay-side Station to Milwaukee Bridge Co., Milwaukee.
- 500 Tons, Lancaster Pa., Armstrong Cork Co. addition to building and auditorium, to Bethlehem Steel Co., Bethlehem, Pa.
- 450 Tons, Minnesota Bridge 5718, Kettle River, to American Bridge Co., Pitts-burgh.
- 230 Tons, Douglas County, Wis., state high-way construction has been abandoned.
- 200 Tons, Wood County, Wis., state highway construction to Worden Allen Co., Milwaukee.
- 200 Tons, Dunn County, Wis., state highy construction to Worden Allen Co., I waukee.
- 160 Tons, Chicago, factory building for Burton Auto Spring Co. to Duffin Iron Co., Chicago.
- Tons, Philadelphia, Smith, Kline & French, addition to contract, to Bethlehem Steel Co., Bethlehem, Pa. 125 Tons.
- 105 Tons. Lackawanna County, Pa., Pennsylvania Dept. of Highways LR-168, section 11-B, to American Bridge Co., Pitts-busch

• • • Fabricated steel inquiries this week included the following:

- 7000 Tons, New York City Colonial Village housing project, Savings Bank Trust Co.
- 1500 Tons, Indianapolis, Ind., war memorial building for American Legion.
- 1500 Tons, Milwaukee, Evinrude Motors building.
- 600 Tons, Chicago, alterations to Carson Pirie Scott building.
- 560 Tons, Milwaukee, 30 million gal propane tanks.
- 250 Tons, Newport, Del., E. I. du Pont de Nemours Co., building, revision of esti-mated tonnage, bids in.
- 215 Tons, Milwaukee, International Harvester building.
- 160 Tons, Santa Barbara County, Calif., additions to Gibraltar Dam and appurtenant structures, City Clerk, Santa Barbara, bids to May 15.

- 150 Tons, Luzerne County, Pa., Pennsylvania Dept. of Highways, Wyoming bridge, May 9.
- 140 Tons, Jefferson County, Wis., highway bridge.
- 130 Tons, Lancaster, Pa., McCrory Stores Corp., building.
- 100 Tons, Wilkes-Barre, Pa., Ma Co., sales and service building. Main Motors

• • • Reinforcing bar awards this week included the following:

- 1400 Tons, Odair, Wash., Grand Coulee pumping plant, Bureau of Reclamation, Denver, Inv. G-38,247-A, to Sheffield Steel Corp., Kansas City.
 1000 Tons, Seattle, University of Washington medical center, through J. C. Boertluge, to Northwest Steel Rolling Mills, Seattle.
- 965 Tons, Kingman, Ariz., Davis power plant, Bureau of Reclamation, Denver, Inv. 7478-A, to Sheffield Steel Corp., Kansas City.
- 510 Tons, Arizona and Nevada, Davis Dam on the Colorado River, Commissioner of Reclamation, Dept. of Interior, to Capi-tol Steel & Iron Co., Oklahoma City, tol S Okla.
- Okla.

 500 Tons, Spokane, Wash., Sacred Heart hospital, through Lee Bouten, to Northwest Steel Rolling Mills, Seattle.

 495 Tons, Odair, Wash., Grand Coulee machine shop, Bureau of Reclamation, Denver, Inv. G-38,248-A, to Sheffield Steel Corp., Kansas City.

 250 Tons, Buffalo, Allied Mills grain elevator through James Stewart Corp. to Bethlehem Steel Corp., Bethlehem, Pa.

 250 Tons, Seattle, University of Washington engineering building, through Sound Construction Co., to Northwest Steel Rolling Mills, Seattle.

 130 Tons, Dryden, Wash., state highway

- Mills, Seattle.
 130 Tons, Dryden, Wash., state highway bridge, through Henry Harman, to Northwest Steel Rolling Mills, Seattle.
 120 Tons, Appleton, Wis., powder plant, F. H. Meyer, Oshkosh, Wis., contractor, to J. T. Ryerson & Sons.
 100 Tons, Chicago, building, Goodman Mfg. Co. to Sumner Sollitt Co.

• • • Reinforcing bar inquiries this week included the following.

- 2000 Tons, Denver, intake structure, etc.. Cherry Creek, Denver district, Corps of Engineers, Spec. 05-016-47-10, bids to May 19
- 410 Tons, Phoenix, sewage treatment plant additions, City Clerk, Phoenix, bids to May 19.
- 245 Tons, Dinuba, Calif., bridge across Kings River, California Div. of Hirhways, Sac-ramento, bids to May 21.

- 160 Tons, San Bernardino County, Calif... overhead crossing at Kaiser spur and undercrossing at Kaiser Road, California Div. of Highways, Los Angeles, bids to May 22.
- 110 Tons, Lewis County, Wash., bridges and viaducts, Stevens Canyon highway, Pub-lic Roads Administration, Portland, Ore.. bids to May 13.
- 100 Tons, Safford, Ariz., bridge on Geronimo-Solomansville Highway, State Highway Commission, Phoenix, bids to May 9.

• • • Sheet piling awards this week included the following:

320 Tons, Rochester, N. Y., reconstruction of barge canal dyke near Bushnell Basin, through McLain Construction Co., to Bethlehem Steel Co., Bethlehem, Pa.

• • • Railroad car awards this week included the following:

American Car & Foundry Co. has been awarded a contract by the Chesapeake & Ohio Ry. for 3000 coal hopper cars. The Pittsburgh, Shawmut & Northern R.R. Co. has ordered from Pressed Steel Car Co. 200 50-ton hop-

February Index Declines

Washington

• • • A revised composite index of selected construction materials issued by the Dept. of Commerce construction division shows a 5.4 pct decline in February over January owing to fewer working days and seasonal factors.

It was said, however, that on the basis of daily production the high rate of the last half of 1946 was maintained. The February indexes (August 1939 as 100) for each of 10 specific materials were:

Cast iron soil pipe and fittings, 158.1; fabricated structural steel. 124.1; cast iron radiation, 84.0; concrete reinforcing bars, 130.6; rigid steel conduits and fittings, 170.0; wire nails and staples, 120.0; warm air furnaces, 214.3; mechanical stokers, 30.2; water heaters (except electric), 280.1; and range boilers, 63.0.

Blast Furnace Capacity and Production-Net Tons

	Number of Companies			-		PRODUCT	TION					
					PIG I	RON	FERRO-MAN AND SPI			TOTA	L	
		Annual Blast Furnace Capacity	Annual							Pct of (Capacity	
				Year to Date	March	Year to Date	March	Year to Date	March	Year to Date		
DISTRIBUTION BY DISTRICTS: Eastern Pittsburgh-Youngstown Cleveland-Detroit Chicago Southern Western	11 16 6 7 8 4	12,551,280 25,042,040 6,577,500 14,097,710 4,924,670 2,536,000	941,014 2,002,040 521,705 1,085,738 330,530 196,356	2,724.090 5,769,664 1,508,091 3,097,132 969,960 531,871	25,287 10,497 8,648 1,042	76,607 48,865 27,861 5,530	966,301 2,012,537 521,705 1,085,738 339,178 197,398	2,800,697 5,818,529 1,508,091 3,097,132 997,821 537,401	90.6 94.6 93.6 90.6 81.1 91.6	90.5 94.2 93.2 89.1 82.1 85.9		
Total	36	65,709,200	5,077,383	14,600,808	45,474	158,863	5,122,857	14,759,671	91.8	91.1		

Source: American Iron & Steel Institute

Problem of Reducing Unit Cost Discussed at Tool Forum

Buffalo

• • • The 11th annual machine tool electrification forum held by Westinghouse Electric Corp., Apr. 22 and 23, brought into sharp focus a major problem facing the machine tool industry. That problem is devising ways to reduce unit cost in metalworking industries and must be accomplished by new designs, new techniques, new materials and the mechanization of processing and fabricating metals.

The 2-day meeting started with this prologue when L. E. Osborne, senior vice-president in charge of operations for Westinghouse opened the meeting, and the theme was carried throughout the forum by such authorities as Tell Berna, general manager, National Machine Tool Builders Assn.; Alexander G. Bryant, vice-president, Cleereman Machine Tool Co., and first vice-president of NMTBA.

Mr. Osborne pointed to this critical need by stating that before the war Westinghouse could make a fair profit on \$200 million worth of business a year, but now such billings mean a loss. Unit labor cost has been going up steadily, he said, since 1933, but the acceleration was great in 1941 and again in the fall of 1945. Wages and salaries are rising far faster than production per manhour.

Reporting on the status of the machine tool industry, Mr. Berna said the short term outlook is bad, and orders have been declining steadily for more than a year. With \$600 million a year capacity, the industry now is booking about \$14 million worth of machine tool orders a month, with \$4 million to \$5 million worth of that business from foreign nations.

Hopeful that mid-year will see a definite improvement in labor and its various tangents, Mr. Berna feels that with that will come the release of new expansion and rehabilitation programs in inGood Long-Term Outlook For Machine Tool Industry Seen by Tell Berna

dustry, with consequent greater machine tool business.

Low backlogs of the industry, he pointed out, mean better deliveries and firm prices, as well as a stronger industry position with respect to surplus tools. The industry itself is quite spotty, with some builders working full schedules and others laying off men. With a fall-off in business, Mr. Berna stated, there is a tendency toward change of ownership in the industry and consolidations of companies. This frequently takes fine products off the market, he added.

long-term outlook, Berna believes, is excellent. Manufacturing plants got a taste of good tools and good tooling during the war, and its effect will be felt for a long time. Foreign nations are expanding their metalworking industries, and herein lies a huge potential demand for American-made tools. The main tasks before the industry are to make surplus machine tools obsolete so no one will want them and to get out and sell machine tools. With 40 pct of American machine obsoleted, the market is there, but it must be sold.

Callous waste of wealth through cut-price dumping of machine tools by the government was attacked by Alexander G. Bryant, vice-president, Cleereman Machine Tool Co., and first vice-president, NMTBA. To attract favor, the government severely injured the machine tool industry.

Even the importance of setting up adequate defense reserves of machine tools has been "deftly avoided by top government officials, and it will be these same officials who will cry 'bottleneck' at the industry if another emergency strikes," he claimed.

Value of machine tools to be sold in Detroit as part of the national program has been set at \$175 million by Robert F. Haggerty, regional director, War Assets Administration. The remaining surplus war goods has been valued at \$13 billion by WAA officials.

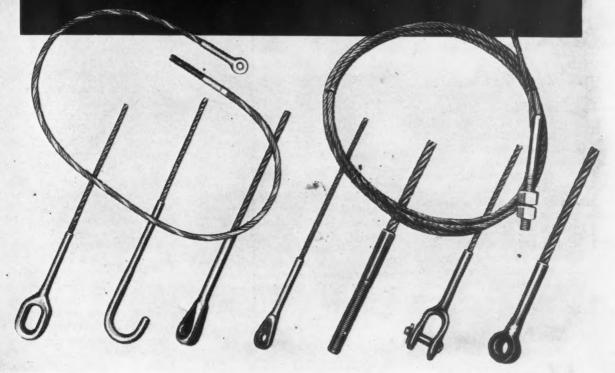
The Detroit region's machine tool sales program is said to be the largest in the country. It is being advertised nationally and catalog listings have been sent to more than 40,000 potential buyers here and abroad, according to WAA officials. The Detroit program gets under way in the face of a sharp reduction in regional personnel. Approximately 200 employees have been removed recently from WAA payrolls and consolidations and other changes in the WAA staff have been aimed at streamlining the organization.

In Cincinnati, Lodge & Shipley Co. is curtailing production temporarily because of a strike of 550 CIO-electrical workers. The machine tool division and special products division, employing about 900 persons, are seriously affected.

Elsewhere in the Cincinnati area, the machine tool market remains unchanged, with domestic buying apparently delayed until the machine tool show this fall and foreign business is holding its own, according to reliable sources in the trade.

In the East, many machine tool builders continue to cultivate the export market and current overseas sales are encouraging. Some producers, however, including builders of automatic drilling machines, report that more than 95 pct of their sales are to domestic buyers. A few sources report sales to domestic users are 50 pct to 65 pct of total volume. This would include certain types of grinding machines, but builders of grinding machines generally are doing from 85 pct to 90 pct of their business in this country.

MACWHYTE "SAFE-LOCK" FITTINGS SWAGED TO WIRE ROPE



Fast, sure, safe, flexible cable controls for direct connection to your equipment

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For controls on mechanical products and machinery, for operating counterbalances, for mining machinery, for yacht rigging, in fact wherever wire rope is used, these units or assemblies are flexible, easy to handle, and safe.

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NONFERROUS METALS

. . . News and Market Activities

Aluminum Production Increases in Canada

Montreal

• • • Aluminum ingot production in Canada for the first quarter of this year by Aluminium, Ltd., was at an annual rate of 230,000 metric tons, as compared with 176,000 tons for the twelve months of 1946 and against 450,000 tons for the peak year 1943, and compares with 42,500 tons in 1937, according to a statement issued at the annual meeting.

In 1946, 86 pct of Canadian aluminum ingot output was exported. The volume of Canadian aluminum exports was several times the prewar peak, the United States, the United Kingdom and 46 other countries sharing in the increased trade at substantially reduced prices. Canada's share of world output increased from one-twelfth a decade ago to three-twelfths now; ingot prices in 1946 were 30 pct less than in 1940.

Copper

• • • Congress passed the bill for the suspension of the copper tariff on Apr. 22 and submitted is for the President's signature. Early this week there has been no further action on the bill, according to trade sources, and it was the impression that the White House was conscious of the probability of a price increase for domestic copper and was attempting to work out a solution to this problem.

The world copper price at latest reports was 2ϕ to $2\frac{1}{4}\phi$ higher than the domestic price and it is reasonably certain that Chilean producers would be unwilling to sell copper to U. S. consumers at less

than would be obtainable abroad. This would naturally set the domestic market price, for domestic producers would be unable to withstand pressure on them for tonnage at a lower price. This price action might be expected within a short time after the effective date of the suspension of the tariff, for it is understood that Chilean producers are ready to divert about half their production to U. S. consumption.

Producers find no slackening in demand for copper, which is natural considering the cut-off in supplies of foreign copper. However, it is noted that production figures for March from the Copper Institute for primary, secondary and refined metal were significantly greater than in recent months.

Indium

• • • • The price of indium remains at \$2.25 per oz. At this price there is an adequate supply of metal and plating salts available to meet all expected demand. Consumption is relatively small at this price, and unless larger market potentialities are found than at present there is little likelihood of any producer setting up a plant adequate to reduce the cost of production.

Lead

• • • Producers of lead are of the opinion that some consumers may be building up some small inventories of metal, as they estimate March shipments were close to 100,000 tons and consumption had been estimated as 80,000 tons per month. However, it is not believed that the industrial pipelines are completely supplied. This is borne

out by the fact that some consumers have asked for shipment of their May quotas in the first ten days of the month.

Shipments of lead, mostly in pig form, are coming in from Mexico, Peru, Australia and Canada despite the fact that the British Ministry of Supply is paying more in blocked sterling than the domestic price, to which must of course be added the duty of 1.0625¢ per lb for pig lead and 0.75¢ for ore and concentrates. The price of lead to consumers when converted at the official rate is 16.19¢, London.

Cadmium

• • • Cadmium producers report that they are being besieged by consumers who are asking for tonnage to the extent of twice the tonnage available for shipment. There are no imports of cadmium because the price of foreign metal is well above the domestic price which remains at \$1.75 per lb.

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Seek Lead in Morocco

Paris

• • • Newmont Mining Corp., St. Joseph Lead Co., and Mines Inc., New York, have taken shares in a new French company styled the Societe Nord Africaine de Plomb. This company has a total capital of \$416,000 and was organized to conduct exploration work in French Morocco.

World Tin Output in '46

London

• • • Estimated world tin production in 1946 totaled 92,000 long tons as against an apparent world consumption of 116,000 long tons. according to the March bulletin of the International Tin Research & Development Council.

Of 1946 output of 92,000 tons. 81,000 tons was produced by the signatory countries to the tin agreement. Bolivia was the largest producer with 37,619 tons, followed by the Belgian Congo (14,091); Nigeria (11,257); Malaya (9438); Netherlands East Indies (8747).

Nonferrous Metals Prices Cents per pound

A	pr. 23	Apr. 24	Apr. 25	Apr. 26	Apr. 28	Apr. 29	
Copper, electro, Conn	21.50	21.50	21.50	21.50	21.50	21.50	
Copper, Lake, Conn	21.625	21.625	21.625	21.625	21.625	21.625	
Tin, Straits, New York	30.00	80.00	80.00		80.00	80.00	
Zinc. East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50	
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80	

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)
Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S. 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30.000 lb.

71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢;
52S, 24.2¢ 61S, 23.3¢; 24S, 24S-AL, 24.2¢;
75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness; 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Primary Metals	
(Cents per lb. unless otherwise no	ted)
Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00 14.00 33.00 14.75 27.50 \$1.75 \$1.57 \$1.57 \$1.50 \$2.25 0 \$95 15.00 90.00 90.00 90.00 \$1.00
contained 2r	•0.10
Remelted Metals	
Brass Ingot	
(Cents per lb, in carloads)	
85-5-5-5 ingot No. 115 No. 120 No. 123 80-10-10 ingot No. 305 No. 315 88-10-2 ingot No. 210 No. 215 No. 215 No. 245 Yellow ingot No. 405 Manganese Bronze No. 421	24.50 22.75 23.25 27.25 22.75 16.25
Aluminum Ingot	
Aluminum Ingot (Cents per 1b, lots of 30,000 1b	1
95-5 aluminum-silicon alloys: 0.30 copper, max. 0.60 copper, max. 16.25 Piston alloys (No. 122 type) 15.00 No. 12 alum. (No. 2 grade) 108 alloy 195 alloy 15.25 AXS-679 Steel deoxidizing aluminium, notch granulated or shot Grade 1—95 pct-977½ pct Grade 2—92 pct-95 pct Grade 3—90 pct-92 pct Grade 4—85 pct-90 pct	17.00 -16.75 -15.25 14.50 14.75 -15.50 14.75
Grade 3—90 pct-92 pct Grade 4—85 pct-90 pct Electroplating Supplies	
Anodes	
(Cents per lb, f.o.b. shipping pos	int in
Copper, frt. allowed	36 %

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base, 30,000 lb. Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 38, 26¢; 148, 32.5¢; 248, 35¢; 538, 618, 28¢; 638, 27¢; 758, 45.5¢; base, 30,000 lb. Wire, Rod and Bar: screw machine stock, rounds, 178-T, ½ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 28, 38, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, colled, B & S gage 17-18; 28, 38, 33.5¢; 568, 39.5¢; 10,000 lb base, B & S gage 00-1; 28, 38, 32.5¢; 568, 39.5¢; 568, 38, 21¢; 568, 38¢; base, 30,000 lb. 37.67 \$24.00 \$ to \$66 75.625 80.00 10.50 \$8.75 Magnesium (Cents per lb. f.o.b. mill. Base quantity 30,000 lb.) Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.183 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, \$1.25-\$1.31; 24, \$1.71-\$1.75. Round Rod, Square and Hexagonal Bar: M, diam, in. ¼ to %, 55¢; % to ¾, 52.5¢; ¾ to 4 in. and over, 52¢. Other alloys higher. 20.00 19.50 diam, in. ¼ to %, ove; 78 to 74, to 3.7. ¼ to 4 in. and over, 52¢. Other alloys higher. Extruded Solid Shapes and Rectangles: M, form factors 1 to 4. 52¢: 8 to 10, 53.5¢: 14 to 16, 56.5¢: 20 to 22, 61¢: 26 to 28, 68¢. Other alloys higher. Tuhing: M, based on weight in pounds per lineal foot, 2 lb. and over, 55¢: 1 to 1.5, 58.5¢: 0.5 to 0.7, 64¢: 0.35 to 0.4, 69¢: 0.25 to 0.3, 73¢: 0.15 to 0.2, 81¢: 0.85 to 0.10, 96¢: 0.05 to 0.06, \$1.14: 0.04 to 0.045, \$1.28. Other alloys higher. 23.25 27.25 22.75 . 16.25 . 18.50 17.00 25-16.75 00-15.25 14.50 14.75 25-15.50 14.75 Nickel and Monel (Cents per lb, f.o.b. mill) Rod 50 Hot-rolled 50 Cold-drawn 55 Angles, hot-rolled 50 Plates 52 Seamless tubes 83 Shot and blocks 83 Zinc (Cents per lb, f.o.b. mill) Copper, frt. allowed Cast, oval, 15 in. or longer. 36% Electrodeposited 31% Rolled, oval, straight, delivered. 32% Brass, 80-20, frt allowed Cast, oval, 15 in. or longer 33% Zinc, Cast, 99.99 183% Nickel, 99 pct plus, frt allowed Cast 51 Copper, Brass, Bronze | Cents per lb | Extruded | Shapes | Rods | Shee | Shapes | Rods | Shee (Cents per lb) Chemicals Chemicals (Cents per lb, f.o.b. shipping point) Copper sulphate, 99.5, crystals, bbls. 11.50 Nickel salts, single, 425 lb bbis, frt allowed 25 lots, per oz 70% Sodium cyanide, 100 oz. lots, per oz 70% Sodium cyanide, 96 pct, domestic, 200 lb drums 15.00 Zinc cyanide, 100 lb drums 34.00 Zinc, sulphate, 89 pct, crystals, bbls, frt allowed 7.75

	Scrap Metals
	(Dealers' buying prices, f.o.b. New York in cents per pound.)
	Brass Mill Scrap
	(Lots of less than 15,000 lb.)
	Cartridge brass turnings 141/4 Loose yellow brass trimmings 151/4
	Copper and Brass
	No. 1 heavy copper and wire 16½—17 No. 2 heavy coper and wire 15½—16 Light copper
	Auto radiators (unsweated) 11 —11½
	No. 1 composition
	Clean red car boxes
	Mixed heavy yellow brass $8\frac{1}{2}$ — 9 Old rolled brass $9\frac{1}{2}$ —10
	Brass pipe $10\frac{1}{2}$ —11 New soft brass clippings $12\frac{1}{2}$ —13
	Cocks and faucets 11 $-11\frac{4}{4}$ Mixed heavy yellow brass $8\frac{4}{2}$ 9 Old rolled brass $9\frac{4}{2}$ -10 Brass pipe $10\frac{4}{2}$ -11 New soft brass clippings $12\frac{4}{2}$ -13 Brass rod ends $13\frac{4}{2}$ $-13\frac{4}{2}$ No. 1 brass rod turnings 13 $-13\frac{4}{2}$
	A I 2
	Alum. pistons free of struts. 5½ — 6
	Aluminum crankcases 7 — 7¼ 2S aluminum clippings 8½ — 9
	Old sheet & utensils
,	Alum. pistons free of struts. 5½ 6 Aluminum crankcases 7 7 7½ 2S aluminum clippings 8½ 9 Old sheet & utensils 7 7 1½ Mixed borings and turnings 2 2½ Misc. cast aluminum 7 7 7½ Dural clips (24S) 4½ 4¾
2	Zinc
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
3	Zinc routings $2\frac{1}{2}$ — $2\frac{3}{4}$ Old die cast scrap $3\frac{1}{4}$ — 4
:	
3	Nickel and Monel
3	Pure nickel clippings
,	Nickel anodes
9	Nickel rod ends
	Clean Monel turnings 9 —16 Old sheet Monel 12 —13
	Old Monel castings
	German silver clippings, mixed 10 14—11 German silver turnings, mixed 7 — 7 14
1	
	Lead
	Soft scrap lead
	Miscellaneous
	Block tin 67 -68 No. 1 pewter 50 -52 No. 1 auto babbitt 40 -43
0	Solder Joints 15 /2 -16
0	Sipnon tops 40 42 Small foundry type 16½-17 Monotype 14 14½
0	Siphon tops
	New type shell cuttings 11½-12
	Clean hand picked type shells 54 6 Lino and stereo dross 54 6 Electro dross 334 4
4	Electro dross 3¾— 4
-	

Lead Products (Cents per lb)

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29.89 31.24 33.42

32.36 36.92

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Full lea	d sheets			18.25
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Lead tra	aps and be	ends	List	+42%
Combina	tion lead	and iro	n benda	
and fe	rrules, als	o comb	ination	
lead a	nd iron fe	errules	List	+42%
	001			

Openhearth Prices Hit New Lows for Year

New York

• • • Steel scrap prices dropped again this week, sending many of the averages to new lows for the year. The Iron Age composite scrap price for No. 1 heavy melting steel delivered to consumers in Pittsburgh, Philadelphia and Chicago, slid off \$1.91 this week. This was made up of average dips of \$2.50, 75¢ and \$2.50 respectively in the cities named. This week's scrap composite price of \$29.92 is \$1.08 less than the 1947 low of \$31 which the composite touched on Jan. 7 as it was on its way up.

Proof that the buyer was having a louder voice in trading than he used to is found this week in Philadelphia, Birmingham and New York, where No. 2 bundles broke away from their wartime tie-up with "heavy melting steel" and sold for at least \$1 less than No. 1. Prices for foundry grades continued to show weakness; they were lower in Pittsburgh, Chicago, Detroit, New York and Buffalo.

When April ended so did many steel mill scrap buying contracts. To date some new lower priced business has been placed but so far brokers and dealers have been matching up to wind up loose ends. The question in the trade now is: How many of these new low priced orders will be delivered? Mills, say brokers, must soon come into the market for large tonnages. But mill buyers see a good volume of industrial scrap coming out as a bearish factor. Observers generally believe the next few weeks will see some price testing.

PITTSBURGH - A mill purchase of considerable heavy melting scrap from two sources last Friday tobogganed the price another \$2.50 a ton to \$29.50 to While there is considerable broker and dealer resistance to the declining trend, the price drop could not be stalled. Mills are holding back on making com-mitments for May, thus tending to further depress the market. The movement of some distress scrap, the result of "price jitters" among brokers, confirmed the \$29.50 to \$30 level, even though the tonnage was small. Scrap stocks at the mills appear, from buyer Scrap activity, to be substantial enough to permit the mills to continue to fight the price of scrap. Because of the continued heavy melt, some observers feel that the price is near the bottom.

CHICAGO — In Keeping with a general tendency to price weakness throughout the country the heavy melting steel market here slid off an average of \$2.50, as heavy openhearth grades were bought this week for \$30 to \$30.50. At least one large buyer was hopeful of being able to get a still lower price but dealers were not so sure it could be done. Railroad lists have not been plentiful but items sold reflect the general weakness of the market. Specialties have not dropped as sharply but railroad sales closings are behind the downward trend in openhearth grades.

PHILADELPHIA-In the absence of new mill purchases the heavy melting market declined again last week based on broker's operations, and a spread developed between heavy melting grades. 1 melting and bundles are quoted at \$29.50 to \$30. No. 2 melting is quoted 50c less on the low side, No. 2 bundles at \$27 to \$28. Low phos prices are down \$2 below last week. Machine shop turnings are down \$2, and other turnings by lesser amounts. Charging box and breakable cast are down to \$40 to \$41. Scrap movement is reported to be slower than ecently and deliveries have been falling behind sales. Consumers' stocks are not considered adequate to permit continued absence from the market and the trade expects buying to be renewed on a normal basis when prices are stabilized at the low point.

NEW YORK—The range being paid early this week for No. 1 and No. 2 heavy melting steel was \$25.50 to \$26.50. down about \$2.25 from last week's average. The lower figure was expected to be more typical later in the week because most buying on old orders ended Apr. 30. All cast grades were also weaker. New business continues good in steelmaking grades.

DETROIT — Scrap market prices here this week are reported to be \$5 lower than the previous quotation as one of the large mill buyers was preparing again to enter the market. It was predicted that at least one large Detroit mill would be in the market again this week. What will happen to scrap prices during May is problematical since most dealer are reported to have their yards well cleaned up at the higher prices currently prevailing. Rejections have skyrocketed and buyers have become increasingly insistent that specifications shall be rigidly met.

CLEVELAND—Major consumers in this area are still out of the market except for shipments of earmarked customer scrap, and are holding out to the bitter end of inventories before coming back in. Shoveling turnings and the foundry grades continue strong, but most other steel items have leveled off, including No. 1, which is in good supply. According to some sources, however, the market is still on the ragged edge and four or five

major consumers coming back in simultaneously could cause a lot of action.

BOSTON—Some buying of heavy steel against old orders continued up to Apr. 30, when they expired, at \$27 a ton. New contract buying has not developed because the price has not been definitely settled. Indications are heavy steel is \$23.50 for a starter, at least, based on current broker bids. Thus the entire 1947 market advance and more too has been wiped out. Locally, cast is holding at \$40 to \$45, with \$43 0 \$45 representing actual transactions. At the beginning of 1947 it was \$40 to \$45.

BUFFALO—Cupola cast fell \$1 to \$2 a ton this week on light sales ranging from \$37 to \$40. Other foundry stuff also showed easier tendencies and one of the leading consumers was bidding \$29 for one foot steel. Openhearth grades were unchanged at \$30 to \$31. Rumors of sales at \$29 to a local mill, variously ascribed to Rochester, Syracuse and eastern Pennsylvania dealers were unconfirmed early this week.

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Mix

CINCINNATI — Prices are unchanged. Although steel mill operators are out of the market, dealers and brokers indicate that they are not in such comfortable positions that they can avoid further purchases much longer, but for the present time are out of the market in an effort to weaken price structure.

BIRMINGHAM—Based on limited purchases, steel making scrap has declined further here with No. 1 heavy melting being sold at \$29 delivered—a \$1 drop. Most old orders will be cleaned up by the end of this week and there is a strong possibility that new commitments for substantial tonnages will be accepted at a lower figure.

ST. LOUIS—A district steel mill came into the market with an order for 10,000 tons of No. 2 heavy melting steel at \$30 which was placed among half a dozen dealers in St. Louis. Dealers have been paying \$29, and have had no difficulty in covering at that price. Other melting grades have been adversely affected, and the market generally for these items is easier. Malleable is unchanged.

SAN FRANCISCO — Prices remain firm and both dealers and buyers doubt that they will follow eastern downward trend. Buyers last week reverted to former practice of paying basing point price (\$19.50 for No. 1 heavy) less freight, instead of \$19.04 plus freight as in the past few months.

TORONTO — Scrap iron and steel receipts are improving slowly in the Canadian markets. Shipments from rural communities have picked up slightly out no large tonnage offerings are reported. No effort is being made to tap the scrap resources in the farm communities and it is not expected that there will be any heavy collections from this source until ceiling prices have been lifted.

PITTSBURGH

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Per gross ton delivered	to consumer:
No. 1 hvy. melting	\$29.50 to \$30.00
RR. hvy. melting	30.50 to 31.00
No. 2 hvy. melting	29.50 to 30.00
RR. scrap rails	42.00 to 43.00
Rails 2 ft. and under	45.00 to 46.00
No. 1 comp'd bundles	29.50 to 30.00
Hand bdld. new shts	29.50 to 30.00
Hvy. axle turn	29.00 to 29.50
Hvy. steel forge turn	29.00 to 29.50
Mach. shop turn	26.00 to 27.00
Short shov: turn	29.00 to 30.00
Mixed bor. and turn	26.00 to 27.00
Cast iron borings	28.00 to 29.00
No. 1 cupola cast	42.00 to 43.00
Heavy breakable cast	30.00 to 31.00
Malleable	44.00 to 45.00
RR. knuck and coup	43.00 to 44.00
RR. coil springs	
Rail leaf springs	43.00 to 44.00
Rolled steel wheels	43.00 to 44.00
Low phos	37.50 to 38.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting\$	30.00 to	\$30.50
No. 2 hvy. melting	30,00 to	
No. 1 bundles	30.00 to	30.50
No. 2 dealers' bundles	30.00 to	30.50
Bundled mach, shop turn.	30.00 to	30,50
Galv. bundles	25.00 to	25.50
Mach. shop turn	26.00 to	26.50
Short shov. turn	27.00 to	27.50
Cast iron borings	26.00 to	
Mix. borings & turn	25.00 to	25.50
Low phos. hvy. forge	35.00 to	
Low phos. plates	32.50 to	33.00
No. 1 RR. hvy. melt	32.50 to	33.00
Rerolling rails	36.00 to	36.50
Miscellaneous rails	34.00 to	35.00
Angles & splice bars	35.50 to	36.00
Locomotive tires, cut	38,00 to	39.00
Cut bolster & side frames	35.50 to	36.00
Standard stl. car axles	38.00 to	38.50
No. 3 steel wheels	36.50 to	
Couplers & knuckles	36.00 to	37.00
Malleable	45.00 to	47.00
No. 1 mach. cast	39,00 te	40.00
Rails 2 ft. and under	38.00 to	
No. 1 agricul. cast	38.00 to	38.50
Hvy breakable cast	35.00 to	35.50
RR. grate bars	36.00 to	37.00
Cast iron brake shoes	36.50 to	
Cast iron carwheels	37.00 to	

CINCINNATI

Per gross ton delivered to co	onsumer:
No. 1 hvy. melting \$30.0	0 to \$31.00
No. 2 hvy. melting 30.0	0 to 31.00
No. 1 bundles 30.0	0 to 31.00
No. 2 bundles 30.0	0 to 31.00
Mach. shop turn 24.0	00 to 25.00
Shoveling turn 25.0	00 to 26.00
	00 to 25.00
	0 to 25.00
Low phos. plate 37.6	0 to 38.00
No. 1 cupola cast 43.0	00 to 45.00
	00 to 35.00
Scrap rails 38.	00 to 39.00

BOSTON Dealers' buying prices per gross ton. f.o.b. cars

No. 1 hvy. melting	\$23.50
No. 2 hvy. melting	23.50
Nos. 1 and 2 bundles	23.50
	21.50
Turnings, shovelings	
Machine shop turn	
Mixed bor. & turn	18.00
Cl'n cast. chem. bor\$21.00 to	22.00
No. 1 machinery cast 40.00 to	45.00
No. 2 machinery cast 40.00 to	45.00
Heavy breakable cast 40.00 to	45.00
Stove plate 40.00 to	45.00

DETROIT

Per gross, ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	24.50 to	\$25.00
No. 2 hvy. melting	24.50 to	25.00
No. 1 bundles	24.50 to	25.00
New busheling	24.50 to	25.00
Flashings	24.50 to	25.00
Mach. shop turn	21.50 to	22.00
Short shov. turn	22.50 to	23.00
Cast iron borings	22.50 to	23.00
Mixed bor. & turn	22.50 to	23.00
Low phos. plate	26.50 to	27.00
No. 1 cupola cast	33.00 to	35.00
Hvy. breakable cast	26.00 to	28.00
Stove plate	30.00 to	32.00
Automotive cast	33 00 to	35.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

Per gross ton delivered	to consum	ier:
No. 1 hvy. melting	\$29.50 to \$	30.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 bundles	29.50 to	30.00
No. 2 bundles	27.00 to	28.00
Mach. shop turn	22.00 to	23.00
Shoveling turn	24.00 to	25.00
Mixed bor. & turn	21.50 to	22.00
Clean cast chemical bor	29.50 to	30.00
No. 1 cupcla cast	45.00 to	46.00
Hvy. breakable cast	40.00 to	41.00
Cast. charging box	40.00 to	41.00
Clean auto cast	45.00 to	46.00
Hvy. axle forge turn	30.00 to	31.00
Low phos, plate	35.00 to	36.00
Low phos. punchings	35.00 to	36.00
Low phos. bundles	33.00 to	34.00
RR. steel wheels	38.00 to	39.00
RR. coil springs	38.00 to	39.00
RR. malleable	50.00 to	52.00

ST. LOUIS

Per gross ton delivered to consumer

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$29.00
No. 2 hvy. melting	28.00
No. 2 bundles	28.00
No. 1 busheling	28.00
Long turnings	22.00
Shoveling turnings	24.00
Cast iron borings	23,00
Bar crops and plate \$32.00 to	33.00
Structural and plate 32.00 to	
No. 1 cast 37.00 to	39.00
Stove plate 35.00 to	36.00
Steel axles	33.00
Scrap rails 30.00 to	31.00
Rerolling rails 36.00 to	37.00
Angles & splice bars 32.00 to	33.00
Rails 3 ft. & under 32.00 to	33.00
Cast fron carwheels 32.00 to	32.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No	. :	1	hvy	. m	elti	n	g				\$29.50	to	\$30.00
											29.50		
Lo	W	p	hos.	pla	ite					۰	36.00	to	36.50
											24.50		
											26.50		
											.25.50		
El	ec.		furn	ace	pu	ın	C	h			36.00	to	36.50

NEW YORK

Brokers' buying prices per gr	oss ton,	on cars
No. 1 hvy. melting	25.50 to	\$26.50
No. 2 hvy. melting	25.50 to	26.50
No. 2 bundles	24.50 to	25.50
Comp. galv. bundles	22.50 to	23.50
Mach. shop turn	20.25 to	21.75
Mixed bor. & turn	20.25 to	21.75
Shoveling turn	21.25 to	22.75
No. 1 cupola cast	38.00 to	40.00
Hvy. breakable cast	36.00 to	38.00
Charging box cast	36.50 to	38.50
Stove plate	36.00 to	38.00
Clean auto cast	36.00 to	38.00
Unstrip. motor blks		
Cl'n chem, cast bor	22.50 to	23.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	30.00 to	\$31.00
No. 2 hvy. melting	30.00 to	31.00
No. 1 bundles	30.00 to	
No. 2 bundles	30.00 to	31.00
No. 1 busheling	30.00 to	
Mach, shop turn	22.00 to	
Shoveling turn	24.00 to	
Cast iron borings	22.00 to	23.00
Mixed bor. & turn	22.00 to	
No. 1 cupola cast	37.00 to	40.00
Charging box cast	29.00 to	30.00
Stove plate	30.00 to	
Clean auto cast	38.00 to	
Malleable	45.00 to	47.00
Low phos, plate	33.00 to	
Scrap rails	32,00 to	
Rails 3 ft. & under	40.00 to	
RR. steel wheels	40.00 to	
Cast iron carwheels	40.00 to	
RR. coil & leaf spgs	40.00 to	
RR. knuckles & coup	40.00 to	43.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$29.00 t	0 \$29.50
No. 2 hvy. melting	29.00 t	0 29.50
Compressed sheet stl	29.00 t	0 29.50
Drop forge flashings	29.00 t	0 29.50
No. 2 bundles	29.00 t	0 29.50
Mach. shop turn	24.00 t	0 24.50
Short shovel	26.00 t	0 26.50
No. 1 busheling	29.00 t	0 29.50
Steel axle turn	29.00 t	0 29.50
Cast iron borings	25.00 to	0 .25.50
Mixed bor. & turn	25.00 t	
No. 1 machinery cast	40.00 t	0 42.00
Malleable	50.00 t	
RR. cast	40.00 t	
Railroad grate bars	37.00 t	
Stove plate	37.00 t	
RR. hvy. melting	32.00 t	
Rails 3 ft. & under	40.00 t	
Rails 18 in. & under	41.00 t	
Elec. furnace punch	33.50 t	0 34.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn	13.00
Elec. furn. 1 ft. und	25.00
No. 1 cupola cast\$32.00 to	33.00
RR. hvv. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach, shop turn	
No. 1 cupola cast \$35.00 to	36.00
RR. hvv. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1	& N	No. 2	hvy.	melt.	\$20.00	to	\$21.00
Elec.	furr	1. 1	ft. un	d	23.00	to	25.00
No. 1 RR.	cup hvy.	ola o	east lting.		21.00	to	29.00 22.00

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point

Cast grades 1.0.b. suipping po-	
Heavy melting	\$17.50
No. 1 bundles	17.50
No. 2 bundles	17.00°
Mixed steel scrap	15.50
Rails, remelting	18.504
Rails, rerolling	21.50
Bushelings	13.004
Mixed borings & turnings	12.50
Electric furnace bundles	20.50
Manganese steel scrap	20.00
No. 1 cast	19.00
Stove plate	17.50
Car wheels, cast	19.50
Malleable iron	16.00
* Ceiling price	

Comparison of Prices . .

(cents per pound) 194		1947	Apr. 30, 1946
	50 2.50	2.50	2.425
	20 3.20	3.20	3.275
	55 3.55	3.55	4.05*
	50 2.50	2.50	2.35
Cold-rolled strip 3.	20 3.20	3.20	3.05
	65 2.65	2.65	2.50
	95 5.95	5.95	4.112
Stain's c-r strip (No. 302) 30. *24 ga	30 30.30	30.30	28.00
Tin and Terneplate: (dollars per base box)			
Tinplate, standard cokes. \$5.	75 \$5.75	\$5.75	\$5.00
Tinplate, electro (0.50 lb) 5.	05 5.05	5.05	4.50
	90 4.90	4.90	4.30
Bars and Shapes: (cents per pound)			
	60 2.60	2.60	2.50
	20 3.20	3.20	3.10
	05 3.05	3.05	2.92
	50 2.50	2.50	2.35
Stainless bars (No. 302). 26.		26.00	24.00
	15 6.15	6.15	4.76
Wire and Wire Products: (cents per pound)			
	30 3.30	3.30	3.05
Wire nails 3.	75 3.75	3.75	3.25
Rails: (dollars per 100 lb)			
	.50 \$2.50	\$2.50	\$43.39*
Light rails 2.	.85 2.85	2.85	49.18*
Semifinished Steel:			
(dollars per gross ton)			
Rerolling billets\$42		\$42.00	\$39.00
	.00 50.00	50.00	38.00
	.00 42.00	42.00	39.00
	.00 50.00	50.00	47.00
Alloy blooms, billets, slabs 61	.00 61.00	61.00	58.43
Wire Rods and Skelp: (cents per pound)			
	.55 2.55	2.55	2.30
	.35 2.35	2.35	2.05
	=.00	2.50	

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

-				_
Pig Iron: (per gross ton)	Apr. 29, 1947	Apr. 22, 1947	Apr. 1, 1947	Apr. 30, 1946
No. 2, foundry, Phila	\$36.51	\$36.51	\$36.51	\$28.34
No. 2. Valley furnace	33.50	33.50	33.50	26.50
No. 2, Southern, Cin'ti	34.75	34.75	34.75	26.94
No. 2. Birmingham	29.88	29.88	29.88	22.88
No. 2, foundry, Chicago;	33.00	33.00	33.00	26.50
Basic, del'd eastern Pa	36.92	36.92	36.92	27.84
Basic. Valley furnace	33.00	33.00	33.00	26.00
Malleable, Chicagot	33.50	33.50	33.50	26.50
Malleable, Valley		33.50	33.50	26.50
Charcoal, Chicago		45.99	45,99	42.34
Ferromanganese‡		135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡ For carlots at seaboard.

Scrap:

(per	gross	ton)

(per gross com)			
Heavy melt'g steel, P'gh. \$29.7	5 \$32.25	\$39.00	\$20.00
Heavy melt'g steel, Phila. 29.7	5 30.50	37.25	18.75
Heavy melt'g steel, Ch'go 30.2	5 32.75	35.75	18.75
No. 1, hy. comp. sheet, Det. 24.7		35.00	17.32
Low phos. plate, Youngs'n 37.2	5 38.25	41.75	22.50
No. 1, cast, Pittsburgh 42.5	0 44.75	45 00	20.00
No. 1, cast, Philadelphia. 45.5	0 45.50	50.00	20.00
No. 1, cast, Chicago 39.5	0 40.50	46.50	20.00

Coke, Connellsville:

(per net ton at oven)

(ber mee oom de ovem)				
Furnace coke, prompt	.\$10.50	\$10.50	\$9.00	\$7.50
Foundry coke, prompt	. 11.25	11.25	10.25	9.00

Nonferrous Metals:

(cents per pound to large buyers)

Copper, electro., Conn	21.50	21.50	21.50	12.00
Copper, Lake, Conn	21.625	21.625	21.625	12.00
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex	33.00	33.00	33.00	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

Composite Prices

FINISHED STEEL

Apr. 29, 19472.86354¢	per	lb
One week ago2.86354¢	per	lb
One month ago2.86354¢		
One year ago2.73011¢	per	lb
777.077		

HI	GH		LOW
1947	2.86354€		2.86354€
1946	2.83599¢ Dec.	31	2.54490¢ Jan. 1
1945	2.44104¢ Oct.	2	2.38444¢ Jan. 2
1944	2.30837¢ Sept.	5	2.21189¢ Oct. 5
1943	2.29176€		2.29176¢
1942	2.28249¢		2.28249¢
1941	2.43078¢		2.43078¢
1940	2.30467¢ Jan.	2	2.24107¢ Apr. 16
1939	2.35367¢ Jan.		2.26689¢ May 16
1938	2.58414¢ Jan.	4	2.27207¢ Oct. 18
1937	2.58414¢ Mar.	9	2.32263¢ Jan. 4
1936	2.32263¢ Dec.	28	2.05200¢ Mar. 10
1935	2.07642¢ Oct.	1	2.06492¢ Jan. 8
1934	2.15367¢ Apr.	24	1.95757¢ Jan. 2 1.75836¢ May 2
1933	1.95578¢ Oct.	3	1.75836¢ May 2
1932	1.79196¢ July	5	1.83901¢ Mar. 1
1931	1.99626¢ Jan.	13	1.86586¢ Dec. 29
1930	2.25488¢ Jan.	7	1.97319¢ Dec. 9
1929	2.31773¢ May	28	2.26498¢ Oct. 29
	777 1 1 1 1 1		hours on seed ton

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

IRON SCRAP STEEL

33.	HIGH	11	\$30.1	LOW	HIGH \$39.67 Mar. 1	18		LOW 2 Apr	
	\$26.12	per	gross	ton	\$19.17	per	gross	ton	
	\$33.15	per	gross	ton	\$37.33	per	gross	ton	
				ton	\$31.83				
				wii		her	gross	1011	,

		_		-
	HIGH	LOW	HIGH	LOW
	\$33.15 Mar. 11	\$30.14 Jan. 7	\$39.67 Mar. 18	\$29.92 Apr. 29
	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
l	\$23.61	\$23.61	19.17 Jan. 11	15.76 Oct. 24
ŀ	23.61	23.61	\$19.17	\$19.17
l	23.61	23.61	19.17	19.17
ŀ	\$23.61 Mar. 20	\$23.45 Jan. 2	\$22.00 Jan. 7	\$19.17 Apr. 10
ı	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
Ì	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
ı	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
l	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
l	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
l	18.21 Jan. 7	15.90 Dec. 16	. 15.00 Feb. 18	11.25 Dec. 9
1	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chi-

\$90.00 nor gross ton

MEASURING GAS calls for cash register accuracy

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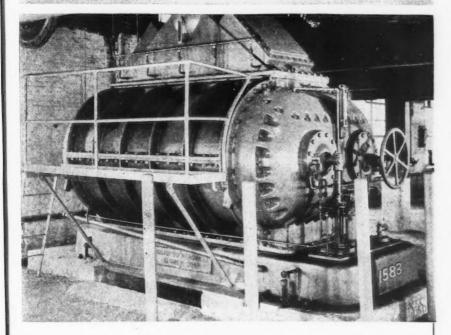
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You'll get just that kind of accurate measurement with Roots-Connersville Positive Displacement Meters. That's because:

1. Accuracy is not affected by variations in specific gravity, rate of flow, pulsation, moisture or impurities

2. Accuracy does not depend on uncontrollable factors.

3. Accuracy is not subject to adjustment of meter or recorder

4. Accuracy is not affected by reasonable overloads.

5. Accuracy is permanent because measuring chambers are surrounded by precision machined cast-iron surfaces.

Other advantages of R-C Meters include: negligible operating cost, small space requirements and continuous, dependable performance.

For accurately measuring production, consumption or delivery of gas and for interdepartmental accounting, you can count on the cash-register accuracy of Roots-Connersville Positive Displacement Meters. For detailed data, ask for Bulletin 40-B-14—free, of course.

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ENTRIFUGAL BLOWERS - EXHAUSTERS - BOOSTERS - LIQUID AND VACUUM PUMPS - METERS - INERT GAS GENERATORS

ONE OF THE DRESSER INDUSTRIES *

LET R-C dual-ability PLAN YOUR BLOWERS

If your business calls for moving gas or air at moderate pressures, we can plan and supply your equipment. Many sizes and types of standard units are available. For special applications, our engineers are alert to every means of giving you the best results for the money invested.



Centrifugal Blowers and Exhausters, in single or multistage units, are built for capacities up to 50,000 CFM or higher.



Rotary Positive Blowers are available in capacities from 10 CFM up. Simple

design and construction free them from maintenance troubles. Many types and sizes are available for built-in or separate applications.



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flammable gases or liquids are stored or handled.

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BOOSTERS	LIQUID PUMPS_
INERT GAS GE	NERATORS

TITLE

= Iron and Steel Prices . . .

Steel prices shown here are f.o.b basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 bt 089,999 bt. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6 (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Some producers are charging 2.76c. (17) Delivered Los Angeles; add ½c per 100 lb for San Francisco. (18) Delivered Los Angeles only. (19) Fabricated.

								S		Middle-		San Franc'co,	DEL	IVERED	то
Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Bir- mingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	town, Ohio		Los Angeles, Seattle	Detroit	New York	Phila- delphia
INGOTS Carbon, rerolling							(\$35.0	0 f. o. b. r	nill)						
Carbon, forging	\$40.00	\$40.90	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00								
Alloy	\$52.00										Canton=	\$52,00)	I-		
BILLETS, BLOOMS, SLABS Carbon, rerolling	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	\$42.00	=\$53.20) \$42.00					\$45.00		
Carbon, forging billets	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	(Prov. \$50.00	0=\$61.20, \$50.00	Duluth=	\$52,0013)	1			\$53.00		
Alloy	\$61.00	\$61.00				\$61.00		Bethleher	n, Massill	on, Canton	=\$61.00)	\$64.00		
SHEE. JARS	-			_			\$53,00			uth, Ohio:					
PIPE SKELP	2,35€	2.35€					2.35é	2.35é			esville=2	2.35é)		_	
WIRE RODS	2.55é	2.55é		2.55€	2,55é			rcester=2	654)	(000		3.27€13			
SHEETS	2.00¢	2.55€		2.000	2.501			000101 - 2	1						
Hot-rolled	2.50∉	2.50€	2.50¢	2.50∉	2.50€	2.50€	2.50∉	2.50∉	2.875∉	2.50¢		3.24/17	2.65∉	2.79¢	2.70
Cold-rolled 1	3.20∉	3.20¢	3.20∉	3.20€		3.20∉	3.20∉		3.30€				3.35¢	3.61∉	3.58
Galvanized (10 gage)	3.55€	3.55é	3.55€		3.55€		3.55¢	3.55€	3.65∉			4.32¢17		3.84∉	3.75
Enameling (12 gage)	3.55∉	3.55∉	3.55∉	3.55¢			3.55€		3.65∉				3.70¢	3.95∉	3.93
Long ternes ² (10 gage)	3.55€	3.55€	3.55¢											3.95∉	3.91
STRIP Hot-rolled ³	2.50€	2.50€	2.50¢	2,50¢15	2.50∉		2.50∉						2.65∉	2.93∉	2.88
Cold-rolled 4	3.20∉	3.30€		3.20€			3.20€			(Worceste	=3.40¢)		3.35¢	3.61¢	3.58
Cooperage stock	2.80€	2.80∉			2.80∉		2.80€							3.09€	
TINPLATE Standard cokes, base box	\$5.75	\$5.75	\$5.75		\$5.85			\$5.85	\$5.85		(Warr	en, Ohio=	\$5.75)	\$6.157	\$6.062
Electro, box 0.25 lb. 0.50 lb. 0.75 lb.	lectro, box 0.50 lb. Deduct 70¢ from standard coke base box price.														
BLACKPLATE, 29 gage 5	3.60€	3.60€	3.60∉		3.70€			3.70∉	3.70∉		(Warr	en, Ohio=	\$5.75)	3.99∉	3.90
BLACKPLATE, CANMAKING 55 lb. to 70 lb. 75 lb. to 95 lb. 100 lb. to 118 lb.				-	-1	Deduc	et \$1.55 fro et \$1.65 fro et \$1.55 fro	om standa	rd coke ba	se box.		1			
TERNES, MFG., Special coated						Deduc	t 85¢ from		anka bana	hau aslas				1	1
BARS Carbon stoel	2.60∉	2.60€			_			standard	CUKE Dase	DOX DLICA					
D	-	moor	2.60€	2.60	2.60∉	2.60	2.60€		COKO Dase	box price.		3.285∉	2.75∉	3.01∉	2.98
Rail steel 6, 19	2.95€		2.60¢	2.60		-			COKO Dase	DOX price.		3.285∉	2.75¢	3.01∉	2.98
Rail steel 6, 19 Reinforcing (billet) 7	2.95¢ 2.45¢	2.95é	2.95¢		2.95∉	2.95	1			dox price.		3.285¢	2.75¢	3.01∉	
		2.95¢ 2.45¢	2.95¢ 2.45¢	2.95	2.95¢	2.95	2.45¢			dox price.			2.75¢		
Reinforcing (billet) 7	2.45∉	2.95¢ 2.45¢ 2.60¢	2.95¢ 2.45¢ 2.60¢	2.95	2.95¢ 2.45¢ 2.60¢	2.95	2.45¢			DOX price.			2.75¢		2.98
Reinforcing (billet) ⁷ Reinforcing (rail) ⁷ , ¹⁶	2.45¢	2.95¢ 2.45¢ 2.60¢ 3.20¢	2.95¢ 2.45¢ 2.60¢ 3.20¢	2.45	2.95¢ 2.45¢ 2.60¢	2.95¢ 2.45¢ 2.60¢	2.45¢	2.45¢		Massillon,		2.985¢		2.74∉	2.65
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8	2.45¢ 2.60¢ 3.20¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢	2.95¢ 2.45¢ 2.60¢ 3.20¢	2.95¢ 2.45¢ 2.60¢ 3.20¢	2.95¢ 2.45¢ 2.60¢	2.95¢ 2.45¢ 2.60¢ 3.20¢	2.45¢ 2.60¢ 3.05¢	2.45¢				2.985¢	3.35¢ 3.20¢	2.74¢	3.58
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled	2.45¢ 2.60¢ 3.20¢ 3.05¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢	2.956 2.456 2.606 3.206 3.806	2.95¢ 2.45¢ 2.60¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢	2.45¢ 2.60¢ 3.05¢	2.45¢	thlehem, F	Massillon,	Canton =	2.985¢	3.35é	2.74¢ 3.61¢	2.65
Reinforcing (billet) 7 Reinforcing (raii) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.956 2.456 2.606 3.206 3.806	2.95¢ 2.45¢ 2.60¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢	2.45¢ 2.60¢ 4 3.05¢	2.45¢	thlehem, F	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢	2.74¢ 3.61¢	3.58
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.956 2.456 2.606 3.206 3.806	2.95¢ 2.45¢ 2.60¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢	2.45¢ 2.60¢ 3.05¢ 2.65¢	2.45¢	thlehem, F	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢	2.74¢ 3.61¢ 2.87¢	2.65 3.56 3.19 2.88 4.20
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 3.79¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.956 2.456 2.606 3.206 3.806 2.656	2.95¢ 2.45¢ 2.60¢ 4 2.65¢	2.956 2.456 2.606 3.206 3.056 3.806	2.45¢ 2.60¢ 3.05¢ 4.2.65¢	2.45¢ (Bei	sville, Cl	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢ ah=2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢	2.65 3.55 3.15 2.81 4.22 3.89
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 5 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.956 2.456 2.606 3.206 3.806 2.656	2.95¢ 2.45¢ 2.60¢ 2.65¢ (Co 2.50¢	2.956 2.456 2.606 3.206 3.056 3.806	2.45¢ 2.45¢ 2.60¢ 3.05¢ 2.65¢ (Gene	2.45¢ (Bei	sville, Cl	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢ ah=2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢	2.65 3.58 3.15 2.81 4.21 3.89
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 2.65¢ 3.90¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.956 2.456 2.600 3.206 3.806 2.656	2.95¢ 2.45¢ 2.60¢ 2.60¢ (Co 2.50¢	2.956 2.456 2.606 3.206 3.056 3.806	2.45¢ 2.60¢ 3.05¢ 2.65¢ (Genee	2.45¢ (Bel (Coate 2.65¢	2.65¢) (I	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢ ah=2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢	2.65 3.58 3.15 2.81 4.21 3.89
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R 0.26 to 0.40 carbon	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢ 3.20¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.95, 2.45, 2.60, 3.20, 3.80, 2.65,	2.95¢ 2.45¢ 2.60¢ 4 2.65¢ (Co 2.50¢	2.956 2.456 2.606 3.206 3.056 3.806	2.45¢ 2.60¢ 3.05¢ 2.65¢ (W) (W)	2.45¢ (Bel (Coate 2.65¢	= 2.65¢) (I 3.40¢)	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢ ah=2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢	2.65 3.58 3.15 2.81 4.21 3.89
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R 0.28 to 0.40 carbon 0.41 to 0.60 carbon	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢ 4.70¢ 5.30¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.79¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.95 ₆ 2.45 ₉ 2.60 ₉ 3.20 ₆ 3.80 ₉ 2.65 ₆ 3.20 ₆ 4.70	2.95¢ 2.45¢ 2.60¢ 4 2.65¢ (Co 2.50¢	2.956 2.456 2.606 3.206 3.056 3.806	2.45¢ 2.60¢ 3.05¢ 2.65¢ (W) (W) (W)	2.45¢ (Bel (Coata 2.65¢	2.65¢) (1 3.40¢) 4.90¢)	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢ ah=2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢	2.65 3.55 3.15 2.81 4.22 3.89
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R 0.26 to 0.40 carbon 0.41 to 0.60 carbon 0.61 to 0.80 carbon 0.81 to 1.00 carbon	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢ 4.70¢ 5.30¢ 6.80¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.79¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.95 ₆ 2.45 ₆ 2.60 ₆ 3.20 ₆ 3.80 ₆ 2.65 ₆ 3.20 4.70 5.30 6.80	2.95¢ 2.45¢ 2.60¢ 3 4 4 2.65¢ (Co 2.50¢	2.956 2.456 2.606 3.206 3.056 3.806	2.45¢ 2.60¢ 3.05¢ 2.65¢ (Gene (W (W	(Bel (Coate 2.65é va, Utah= orcester= orcester= orcester=	2.65¢) (13.40¢) 4.90¢) 7.00¢)	Massillon,	Canton =	2.985¢	3.35¢ 3.20¢ 3.95¢ ah=2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢	2.6 3.5 3.1 2.8 4.2 3.89
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 5 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R 0.26 to 0.40 carbon 0.41 to 0.60 carbon 0.61 to 0.80 carbon	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢ 4.70¢ 5.30¢ 6.80¢ 9.10¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.95, 2.45, 2.60, 3.20, 3.80, 2.65, 3.20, 4.70, 5.30	2.95¢ 2.45¢ 2.60¢ 2.60¢ 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 4.250¢	2.45¢ 2.60¢ 3.05¢ 2.65¢ (W) (W) (W) (W)	2.45¢ (Bel (Coata 2.65¢ orcester = orceste	2.65¢) (1 3.40¢) 4.90¢) 5.50¢) 7.00¢)	Massillon,	Canton = 2.80¢, G	2.985¢	3.35¢ 3.20¢ 3.95¢ ah = 2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢	2.66 3.56 3.16 2.86 4.21 3.899 2.66
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-rolled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R 0.26 to 0.40 carbon 0.41 to 0.60 carbon 0.61 to 0.80 carbon 0.81 to 1.00 carbon Over 1.00 carbon	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 3.79¢ 2.50¢ 4.70¢ 5.30¢ 6.80¢ 9.10¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.80¢ 2.65¢	2.956 2.456 2.606 3.206 3.806 2.656 3.200 4.700 5.300 6.800 9.100	2.95¢ 2.45¢ 2.60¢ 2.60¢ 4 2.65¢ (Co 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 4.250¢	2.45¢ 2.60¢ 3.05¢ 2.65¢ (W) (W) (W) (W) (W)	2.45¢ (Bel (Coata 2.65¢ orcester= orcester= orcester= orcester= orcester= orcester=	2.65¢) (1 3.40¢) 4.90¢) 5.50¢) 7.00¢) 9.30¢)	Aassillon, aymont =	Canton = 2.80¢, G	2.985¢ 3.05¢) 3.46¢14 3.17¢1	3.35¢ 3.20¢ 3.95¢ ah = 2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢ 2.70¢	2.66 3.56 3.16 2.86 4.21 3.899 2.66
Reinforcing (billet) 7 Reinforcing (rail) 7, 16 Cold-finished 8 Alloy, hot-roiled Alloy, cold-drawn PLATE Carbon steel 12 Floor plates Alloy SHAPES, Structural SPRING STEEL, C-R 0.26 to 0.40 carbon 0.41 to 0.60 carbon 0.61 to 0.80 carbon 0.81 to 1.00 carbon Over 1.00 carbon MANUFACTURERS' WIRE 18 Bright 10	2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 3.90¢ 3.79¢ 2.50¢ 4.70¢ 5.30¢ 6.80¢ 9.10¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ 2.65¢ 2.65¢ 2.50¢ 4 4 5 4 5 4 5 3.30¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 2.65¢	2.956 2.456 2.606 3.206 3.806 2.656 3.200 4.700 5.300 6.800 9.100	2.95¢ 2.45¢ 2.60¢ 2.65¢ (Co 2.50¢	2.95¢ 2.45¢ 2.60¢ 3.20¢ 3.05¢ 3.80¢ atesville= \$ 2.50¢	2.45¢ 2.60¢ 3.05¢ 2.65¢ (W) (W) (W) (W)	2.45¢ (Bel (Coata 2.65¢ va, Utah = orcester = orceste	3.40¢) 4.90¢) 5.50¢) 7.00¢) 9.30¢) = 3.40¢, [Aassillon, aymont= aymont= buluth=3. tra te Brig	Canton = 2.80¢, Go	2.985¢ 3.05¢) 3.46¢14 3.17¢1	3.35¢ 3.20¢ 3.95¢ ah = 2.80¢)	2.74¢ 3.61¢ 2.87¢ 4.30¢ 4.01¢ 2.70¢	2.65 3.56 3.15 2.81 4.21 3.891 2.64

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BPWMCPt

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

	Chromiu	m Nickel	Straight Chromium				
Basing Point		No. 302	No. 410	No. 430	No. 442	No. 446	
ngot, P'gh, Chi, Canton, Bait, Reading, Ft. Wayne, Phila llooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt llabe, P'gh, Chi, Canton, Bait, Phila, Reading. lillets, P'gh, Chi, Canton, Watervilet, Syracuse, Balt. lillets, forging, P'gh, Chi, Canton, Dunkirk, Bait, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville.	Subject to 22.99 22.99 Subject to	negotiation 24.67 24.67 negotiation	17.01 17.01	17.47	negotiation 20.69 20.69 negotiation	25.29 25.29	
wie, iri, i' ge, om, centon, bunkirk, materine, syracuse, bail, rinia, heading.	23.00	22.50	17.50	17.50	21.00	25.50	
Ft. Wayne, Titusville. ars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading,		26.00	20.50	21.00	24.50	30.00	
Ft. Wayna, Watervilet. **lates, P'gh, Middletown. Canton hapes, structural, P'gh, Chi. heets, P'gh, Chi, Middletown, Canton, Bait. strip, h-r, P'gh, Chi, Andidig, Canton, Youngstown strip, b-r, P'gh, Chi, Rowark, N. J., Reading, Canton, Youngstown strip, b-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown Wire, b-d, Cleve, Dunkirk, Syracuse, Bait, Reading, Canton, P'gh, Newark, N. J. Phila., Ft. Wayne. Wire, flat, b-r, Cieve, Bait, Reading, Dunkirk, Canton order, Syracuse ord	31.50 27.50 39.00 25.50 32.50 27.50 32.46	26.00 29.50 26.00 37.00 23.50 30.50 26.00 30.30 25.97 72.09	20.50 23.50 20.50 29.00 18.50 24.00 20.50 23.80 20.02	21.00 24.00 21.00 31.50 19.00 24.50 21.00 24.34 20.56 68.49	24.50 28.00 24.50 35.50 26.00 35.00 24.50 34.62 24.34	30.00 33.00 30.00 39.50 38.00 56.50 30.00 56.26 29.75	

TOOL STEEL

(.F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)

W	Cr	v	Мо					Base per lb
18	4	1	_					 74¢
1.5	4	1.5	8					
6	4	2	6					 63¢
High-c	arbon	-chro	mium	1.				. 47¢
Oil ha	rdeni	ng ma	angai	nes	e*			 . 26¢
Special								
Extra								
Regula								
								of Mis-
sissipp Mississ	are	2¢ 1	per 1	b.				

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

													Per 10
Field grade													4.20¢
Armature													4.50¢
Electrical											8	*	5.00€
Motor													
Dynamo													
Transformer	1	7	2										6.95¢
Transformer	1	6	5										7.65¢
Transformer		5	8										8.35¢
Transformer		5	2										9.15€

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb

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15¢

No. 1 O.H., per 100 lb	\$2.50
Angle splice bars, 100 lb	
(F.o.b. basing points) po	er loo to
Light rails (from billets)	. \$2.85
Light rails (from rail steel), f.o.b	
Williamsport, Pa.	
williamsport, Pa	. 4.30
Ba	se per li
Cut spikes	4.506
Screw spikes	
Tie plate steel	
Tie plate, steel	. 2.004
Tie plates, Pacific Coast	. 2.95
Track bolts	6.506
Track bolts, heat treated, to rai	
Track bolts, heat treated, to rai roads Track bolts, jobbers discount	. 6.750

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, add 25c.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)
20x14 in. 20x28 in.

8-lb coating I.C.... \$6.75 \$13.50

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa	24.00*	22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa	21.50	
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	
Monel-clad 10 pct, f.o.b. Coatesville	29.00	
Aluminized steel Hot dip, 20 gage, f.o.b.		9.00

^{*}Includes annealing and pickling.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	per	Delivered San Francisco
Standard, galvanized and		
coated nails	. \$3.75	7 \$4.83

coated nails \$3. Cut nails. carloads. Pitts-	75† \$4.83
burgh base 5.	30
†10¢ additional at Clevels	and, 30¢ at

worcester				Base per	
Annealed	fence				\$4.96
Annealed	galv	. fe	ne	9	

wire 4.40; 5.41

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

Woven wire fence*	Base 84	column 107
Fence posts, carloads	90††	
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	94	

^{* 15} ½ gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-	Corten	Double Strength No. 1	Dyn- alloy	HI Steel	Mayari R	Otis- coloy	Yoloy	Y-50	NAX High Tensile
Producer	Repub-	Carnegie- Illinois, Republic	Repub-	Alan Wood	Inland	Bethle- hem	Jones & Laughtin	Youngs- town Sheet & Tube	Amer- lean Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10		4.10
Sheets Hot-rolled Cold-rolled Galvanized	3.85 4.75	3.85 4.75 5.40	3.85 4.75	3.85	3.85 4.75	3.85 4.75 5.40 3.85 4.75	3.85 4.75	3.85 4.75	5.225*	3.75 4.55
Strip Hot-rolled Cold-rolled	3.85	3.85	3.85 4.75	****	3.85		3.85 4.75	3.85 4.75	5.00*	3.75 4.55†
Shapes		3.85		-111	3.85	3.85	3.85	3.85		
Beams		3.85	4 = 4			3.85	,			
Bars Hot-rolled Ccld-rolled	4.00	4.00	4.00			4.00	4.00	4.00 4.60		4.00
Bar shapes		4.00			4.00	4.00	4.00	4.00		

^{• 21} gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.ob. Pittsburgh Lorain, steel buttweld and sean Others f.o.b. Pittsburgh only amless

Base price, \$200.00 per net ton

Standard, threaded & coup	andard,	threaded &	coupled
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Standard, threaded &	coupled
Steel, buttweld 1/2 -in. 2/4 -in. 1 to 3-in.	Black Galv. 55 ½ 41 58 ½ 45 60 ½ 47 ½
W ought Iron, buttweld ½ in. ½ in. 1 and 1½-in. 1½-in. 2-in.	2 11 1/4 +10 17 + 2 22 1/4 1/4
Steel, lapweld 2-in	53 39½ 56 42½ 58 44½
Steel, seamless 2-in. 2-½ and 3-in. 3½ to 6-in. Wrought Iron, lapweld	52 38 ½ 55 41 ½ 57 43 ½
2-in. 2½ to 3½-in. 4-in. 4½ to 8-in.	14% + 5% 17 + 1% 21 4 19 2%

Extra Strong, plain ends	
Steel, buttweld	
14-in 541/	411/4
%-in 58 ½	
1 to 3-in 60	48
Wrought Iron, buttweld	
1/2-in 6 1/4	+14
%-in 12 ½	+ 8
1 to 2-in	2
Steel, lapweld	
2-in 52	391/
2 1/2 and 3-in 56	431/
3½ to 6-in 59½	
Steel, seamless	
2-in 51	38 1/4
21/2 and 3-in 55	42 1/4
3½ to 6-in 58½	
Wrought Iron, lapweld	
	4 4 9
2-in. 17½ 2½ to 4-in 26	4 + 2
4½ to 6-in	4 72
1/2 10 0 1110 00.00	-

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded com-mercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

		Sear	nless	Electric Wel				
O.D.	Gage	Hot-	Cold-	Hot-	Cold-			
in in.	BWG	Rolled	Drawn	Rolled	Drawn			
2	13	\$15.29	\$18.17	\$15.00	\$17.95			
21/4	12	20.57	24.43	20.11	24.07			
3	12	22.87	27.18	22.26	26.68			
31/4	11	28.86	34.30	28.06	33.64			
4	10	35.82	42.55	34.78	41.68			

CAST IRON WATER PIPE

Per net ton
6-in, to 24-in, del'd Chicago \$81.56
6-in. to 24-in. del'd New York 79.80
6-in. to 24-in., Birmingham 71.00
6-in. and larger, f.o.b. cars, San
Francisco, Los Angeles for all
rail shipment: rail and water
shipment less 95.00
Class "A" and gas pipe, \$5 extra; 4-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birming-ham or Chicago)

Machine and Carriage Bolts Base discount less case lots Percent Off List

	Percent	
1/2 in. & smaller x 6 in. &	shorter	 55
Over 6 in		
9/16 & % in. x 6 in. & sho	orter	 52
9/16 through 1 in, x over	6 in	 48
% & 1 in. x in. and short		
% in. x 6 in. & shorter		 49
1 % in. and larger, all len	gths	 48
Lag, all diam over 6 in, lor	ng	 48
Lag, all diam x 6 in. & sho	orter	 50
Plow bolts		 57

Nuts, Cold Punched or Hot Pressed

	(Hexagon	OF	20	luar	6)		
1/2 in. and							
9/16 to 1	in. inclusi	ve.					.47
11% to 11/2	in, inclus	sive				 	. 45
1% in. an	d larger .						.44

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts U.S.S. S Base discount less case lots

7/16 in. and smaller	51
½ in. and smaller 48	
½ in. through 1 in	4
9/16 in. through 1 in 47	
1 % in. through 1 ½ in 45	4
1% in. and larger 44	
T- 4-11 1.4	3

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts Consumer Packages, nuts separate60 and 10 In bulk74

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

(1/2 in. and larger) Base per 100 Lb Large Rivets

(7/16 in. and smaller) Percent Off List Small Rivets

Cap and Set Screws (In packages) Percent Off List Consumer Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in x

mie tinesa, up to and met. I m. A
6 in., SAE 1020, bright
4 to 1 in. x 6 in., SAE 1035, heat
treated
ticated
set screws, cup and oval points
filled studs
Plat head cap screws, listed sizes
Fillister head cap, listed sizes

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Effecti										8	hort ton
70% o	r more					0					. \$33.00
65% b	it less	than	ı	70	%						. 32.00
60% b	ut less	than	ı	65	%						. 31.00
Less t	han 60	% .									. 30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered

	Domer	LON	0 4		12.00	0/			
									3 Ton
Old range	besser	ner							\$5.95
Old range,	non-be	essen	ner	,					5.80
Mesabl, be	essemer								5.70
Mesabi, no	n-besse	mer							5.55
High phos	phorus								5.55
Prices	quoted	retr	oac	ti	ve	t	0	Ja	n. 1,

METAL POWDERS

MEINETOTIBLIO	
Prices in cents per pound in ton k	ota,
f.o.b. shipping point.	
Brass, minus 100 mesh 23¢ to	27€
Copper, electrolytic, 100 and 325	
mesh 30¢ to 31	3/4 €
Conner reduced 150 and 200	
mesh	3/4 €
Iron, commercial, 100, 200, 325,	
mesh 96 + % Fe11¢ to	16¢
Swedish sponge iron, 100 mesh, c.i.f.	
N. Y., carlots, ocean bags 7.4¢ to	84
Iron, crushed, 200 mesh and finer,	
90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh	
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum	
lots	66¢
Iron, electrolytic, unannealed, 325	
mesh and coarser, 99 + % Fe. 25¢ to	31¢
Iron, electrolytic, annealed minus	
100 mesh, 99 + % Fe	174
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe90¢ to \$1 Aluminum, 100, 200 mesh, car-	-
98-99.8 + % Fe90¢ to \$1	.70
Aluminum, 100, 200 mesh, car-	004
lots	406
Antimony, 100 mesh 36.	006
Cadmium, 100 mesh	095
Chromium, 100 mesh and mer 41.	504
Lead, 100, 200 & 300 mesh. 18.50¢ to 23. Manganese, minus 325 mesh and	
coarser	334
Nickel 150 mesh . 51	164
Silicon, 100 mesh	154
Solder powder, 100 mesh. 8 1/2¢ plus me	tal
Tin, 100 mesh 86.	75¢
Tungeton metal nowder. 98%-	
99% any quantity, per lb \$	2.80
99%, any quantity, per lb\$ Molybdenum powder, 99%, in 100-	
in kegs, r.o.b. York, Pa., per in.	2.00
Under 100 lb \$2	2.90

COKE

Furnace. beehive (f.o.b. oven) Connellsville, Pa\$10.00 to	Net Ton \$11.00
Foundry, beehive (f.o.b. oven) Connellsville, Pa 11.00	
Foundry, Byproduct Chicago, del'd	
Chicago, f.o.b.	15.10
New England, del'd	. 17.25
Seaboard, Kearney, N. J., f.o.b.	. 15.35
Philadelphia, del'd	
Buffalo, del'd	
Ashland, Ohio, f.o.b.	
Painesville, Ohio, f.o.b.	
Erie, del'd	
Cleveland, del'd	
Cincinnati, del'd	
St. Louis, del'd	
Birmingham, del'd	

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Cartonia, Fer	1 44
First quality, Ohio\$6	
First quality, Pa., Md., Ky., Mo 7	0.00
First quality, New Jersey 7	5.00
Sec. quality, Pa., Md., Ky., Mo 6	4.00
Sec. quality, New Jersey 5	9.00
Sec. quality, Ohio 5	6.00
Ground fire clay, net ton, bulk 1	0.00

Silica Brick

Pennsylvania and Birmingham ... \$70.00 Chicago District ... 79.00 Silica cement, net ton (Eastern) ... 12.00 Chicago ... 13.50

Chrome Brick Standard chemically bonded, Balt., Plymouth Meeting, Chester\$59.00

Magnesite Brick Standard, Balt. and Chester\$81.00 Chemically bonded, Baltimore 70.00

Crain Magnasita

	c, f.o.b.		and	Cheste	er
in sa	cks				.\$44.50
Domesti	c, f.o.b.	Chew	elah,	Wast	l.,
in bu	lk			* * * * * *	24.00
Clinker	(dead	burne	d) d	olomit	0,
Pa., 1	per net t Millersvil	le, O.			. 10.55
	, add 1				

WAREHOUSE PRICES

lots, 27€ 11/4 034 164 0 8# 54 66¢ 314 174 1.75

26¢ 3.05¢ 2.00 .025

33¢ 1½¢ 3.15¢ letal 3.75¢

2.80 2.65 2.90

Ton 1.00

2.00

.10 .25 .35 .46 .14 .35

39 ×5 25

1.00 0.00 5.00 4.00 9.00 6.00

0.00 9.00 2.00 3.50

Ton 9.00

1.00

1.50 4.00 8.00 Base prices, delivered metropolitan areas, per 100 lb.

		SHEETS		STR	NP			BA	RS		ALLOY	BARS	
CITIES	Hot- Rolled (10 gage)	Cold- Rolled (15 gage)	Galvanized (10 gage)	Hot- Rolled	Cold- Rolled	Plates	Standard Structural Shapes	Hot- Rolled	Cold- Finished	Hot- Rolled, A 4615 As-rolled	Hot- Rolled A 4140-50 Ann.	Cold- Drawn, A 4615 As-rolled	Cold- Drawn, A 4140-5 Ann.
Philadelphia	\$4.24 4.42 4.50 4.09	\$5.18 5.171 5.1212	\$5.29 5.47 5.5512 5.14	\$4.43 4.62 4.65 4.40	\$5.28 5.40 6.356	\$4.54 4.72 4.80 4.39	\$4.22 4.37 4.47 4.34	\$4.48 4.62 4.62 4.45	\$5.38 5.42 5.468 5.35	\$8.37 3.42 8.62	\$8.37 8.42 8.62	\$9.88 9.92 9.97	\$9.88 9.92 9.97
Norfolk Chicago Milwaukee Cleveland	4.35 3 85 4.199 4.00	4.799	5.249 5.238	4.05 4.199 4.188	5.05 4.85	4.50 4.25 4.499 4.30†	4.50 4.10 4.249 4.311	4.75 4 10 4.249 4.05	5.50 4.73 5.149 4.95	8.10 8.399 8.358	8.10 8.399 8.358	9.35 9.649 9.35	9.35 9.649 9.35
Buffalo Detroit	4.05 4.15 4.116	4.65 4.75 4.716	5.35 5.42 5.166	4.30 4.34	5.25 5.24	4.55 4.59† 4.803	4.10 4.42 4.444	4.10 4.20 4.403	4.75 5.12 5.303	8.10 8.51	8.10 8.51	9.35 9.74	9.35 9.74 9.824
St. Louis Pittsburgh.	4.199 4.00 4.384 ⁷	4.799 4.601 5.0341	5.424 5.05 5.434 ²	4.199 4.00 4.404 ⁷	5.424 4.95	4.499 4.30 4.684 ⁷	4.249 4.05 4.4347	4.249 4.05 4.434 ⁷	5.324 4.95 5.726	8.574 8.10	8.574 8.10 10.084	9.824	9.35
Ouluth	4.868	6.6181	5.918	4.868	****	5.168	4.918	4.918	5,818	****			
ndlanapolisBlrminghamVemphis.	3.8511		5.20 5.97	4.0011	****	4.3011 4.92	4.0511 4.67	4.0511	5.83 5.78		****	****	
vew Orleansos Angeles	*4.46 ¹¹ 5.35 4.90 ⁸	5.771 7.001 6.309	6.70 6.45	5.65 5.20*	8.355	4.8311 5.2012 5.008	*4.6911 5.2012 4.908	*4.78 ¹¹ 5.10 ¹³ 4.75 ⁸	6.14 6.9014 7.0010	9.6510	9.35	11.05	11.05
Seattle	5.00 5.00 ³ 6.25	7.80	6.30 6.25° 7.71	5.304 5.503 6.50		5.254 5.403 6.10	4.954 5.10 ³ 6.25	5.004 5.103 6.25	7.10 7.20 7.5010		9.30		****

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb:

strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 10,000 lb; (5) 2000 lb and over; (6) 1000 lb

and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 460 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to % in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES				DELIVERED PRICES (BASE GRADES)									
Basing Point	Basic	No 2 Foundry	Maile- able	Besse- mer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malle- able	Besse- mer	Low
Sethlehem Sirdaboro Sirdaboro Sirmingham Suffano Chicago Citeveland Duluth Erie Everett Grantie City Nevilie Island Provo Steeton Stuthers, Ohlo Swedeland Trey, N. Y. Youngstown	29.48 32.50 32.50 32.50 33.00 32.50 29.00 32.50 33.00 33.00 34.00 33.50 37.50	34,50 34,50 29,88 33,00 33,00 33,50 33,50 33,50 33,50 33,50 33,50 33,50 33,50 33,50 33,50 33,50	35.00 35.00 33.50 33.50 33.50 33.50 33.50 33.50 33.50 33.50 33.50 33.50 33.50 33.50 33.50	35.50 35.50 34.00 34.00 34.00 34.00 34.00 35.50 34.00 35.50 35.50 35.50 35.50	39.00	Boston. Buston. Brooklyn Brooklyn Clocinnati Jersey City. Jersey City. Los Angeles Mansfield Philadelphia San Francisco. Seattle. St. Louis	Everett Birdsboro-Steelton Bethlehem Birdsboro Birmingham Bethlehem Birdsboro Cleveland-Toiedo Swedeland Birdsboro Provo Provo Granite City	3.00 3.50 4.87 1.84 2.33 5.94 2.33 1.01 1.49 5.94 5.94	29.50 37.00 34.25 35.84 38.94 34.83 36.01 38.94 38.94 33.25	30,00 37,50 34,75 36,34 39,44 35,33 36,51 39,44 39,44 34,25	30.50 38.00 36.84 35.83 37.01	31.00 38.50 37.34 36.33 37.51	43.82

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pet silicon content in excess of base grade which is 1.75 to 2.25 pet); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pet and over; manganese differentials, a charge not to exceed 50¢ per ton for each

0.50 pct manganese content in excess of 1.60 pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel. Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$40.50; f.o.b. Buffalo—\$41.75. Add \$1.00 per ton for each additional \$6.50 pct Si, up to 12 pct. Add 50% per ton for each 9.50 pct Mn over 1.00 pct.

Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous \$40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, \$45.99. High phosphorous charcoal pig iron is not being produced.

Ferromanganese 78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Balti- more, Philadelphia, New York, Birming- ham, Rockwood, Tenn. Carload lots (bulk)	Ferrochrome (65-72% Cr, 2% max. 84) Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed. Eastern Central Western 0.06% C 23.00 23.40 24.00 0.10% C 22.50 22.90 23.50	Other Ferroalloys Ferrotungsten, standard, lump or 4x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed \$2.08
Less ton lots (packed)	0.10% C 22.50 22.90 23.50 0.15% C 22.00 22.40 23.00 0.20% C 21.50 21.90 22.50 0.50% C 21.00 21.40 22.00 1.00% C 20.50 20.90 21.50 2.00% C 19.50 19.90 20.50 66-69% Cr,	Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. Openhearth
Carload, bulk . 6.40 6.65 7.20 Ton lots 7.30 7.90 9.80 Less ton lots 7.70 8.30 10.20	4-9% C 15.60 16.00 16.15 62-66% Cr. 4-6% C 6-9% Si 16.60 17.00 17.15 Briquets — contract price, cents per	Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 \$1.10
Spiegeleisen Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.	pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium. Eastern Central Western Carload, bulk. 9.85 10.10 10.20	Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight al- lowed, per pound contained Cb Ton lots
16-19% Mn 3% max. Si Carloads \$43.00 \$44.00 \$7.0 \$48.00	Ton lots 10.75 11.65 12.25 Less ton lots 11.15 12.05 12.65 High-Nitrogen Ferrochrome	Les ton lots
Manganese Metal	Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for	pound contained Mo
Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone. 98% min. Mn, 0.2% max. C, 1% max. S1, 2% max. Fe.	each additional 0.25% N. S. M. Ferrochrome Contract price, cents per pound chro-	Molybdenum oxide briquets, 48- 52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo 80¢
Carload, bulk 30 L.c.l. lots 32 Electrolytic Manganese	Contract price, cents per pound chrominum contained, lump size, f.o.b. shipping point, freight allowed. High carbon type: 60-65% Cr, 4-6% SI, 4-6% Mn, 4-6% C.	Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo 80¢
F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound. Carloads 32 Ton lots 34	Eastern Central Western Carload 16.70 17.10 17.25 Ton lots 17.90 19.20 20.00 Less ton lots 18.60 19.90 20.70 Low carbon type: 62-66% Cr, 4-6% Sl,	Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti Less ton lots
Low-Carbon Ferromanganese Contract price, cents per pound Mn con-	4-6% Mn, 1.25% max. C. Eastern Central Western Carload 20.00 20.40 21.00 Ton lots 21.00 21.65 22.85 Less ton lots . 22.00 22.65 23.85	max, ton lots, per pound contained Ti Less ton lots \$1.35 High carbon ferrotitanium, 15-
tained, lump size, f.o.b. shipping point, freight allowed, eastern zone. Carloads Ton Less 0.10% max. C, 0.06%	Chromium Metal Contract prices, cents per lb, chromium	20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton\$142.50
0.10% max. C, 0.06% P, 90% Mn 21.00 21.40 21.65 0.10% max. C 20.50 20.90 21.15 0.15% max. C 20.00 20.40 20.65 0.30% max. C 19.50 19.90 20.15 0.50% max. C 19.00 19.40 19.65 0.75% max. C, 19.00 19.40 19.65	contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe. Eastern Central Western 0.20% max. C 83.50 85.00 86.25	Ferrophosphorus, electrolytic, 23- 26%, carlots, f.o.b. (Siglo) Tenn., \$3 unitage per gross ton \$65.00 Zirconium, 35-40%, contract basis,
1.00 % max. 51 10.00 10.40 10.00	0.20% max. C 83.50 85.00 86.25 0.50% max. C 79.50 81.00 82.25 9.00% min. C 79.50 81.00 82.25	f.o.b. plant, freight allowed, per pound of alloy. Carload, lots 14.50¢
Silicomanganese Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% SI,	Contract memory contracts of alloy, lump, f.o.b. shipping point, freight allowed. 30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60.65% Si, 6.00% max. Fe.	Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight al- lowed, per pound of alloy Carload, bulk
1.5% max. C. Carload, bulk	or 28-32% Ca, 60.65% SI, 6.00% max. Fe. Eastern Central Western Carloads 13.00 13.50 15.55 Ton lots 14.60 15.25 17.40 Less ton lots 15.50 16.25 18.40	Alsifer, 20% Al, 40% Sl, 40% Fe, contract basis, f.o.b. Niagara Falls, carload 6.25¢ Ton lots 6.75¢
freight allowed, per lb of briquet 6.15 Ton lots	Calcium—Manganese—Silicon Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight al-	Simanal, 20% SI, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound Car lots
Si 14.01 to 14.50%, \$56.00 f.o.b. Keokuk, Iowa; \$52.75 f.o.b. Jackson, Ohio; \$54.00 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—	lowed. 16-20% Ca, 14-18% Mn, 53-59% Sl. Eastern Central Western Carloads 15.50 16.00 18.05 Ton lots 16.50 17.35 19.10 Less ton lots 17.00 17.85 19.60	Boron Agents Contract prices per pound of alloy, f.o.b. shipping point, freight allowed. Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.
0.04%, C—1.00%. Silicon Metal	Calcium Metal Eastern zone contract prices, cents per pound of metal. f.o.b. shipping point.	Si, 0.50% max. Al, 0.50% max. C. Eastern Central Western Less ton lots \$1.30 \$1.3075 \$1.329 Manganese—Boron 75.00% Mn, 15-20%
Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed. Eastern Central Western	pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone. Cast Turnings Distilled Ton lots \$1.60 \$2.35 \$2.95	B, 5% max. Fe, 1.50% max. St, 3.00% max C. Ton lots \$1.89 \$1.903 \$1.935 Less ton lots 2.01 2.023 2.055
96% SI, 2% Fe 14.65 16.90 18.65 97% SI, 1% Fe 15.05 17.30 19.05 Ferrosilicon Briquets	CMSZ Contract price, cents per pound of al-	Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.
Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb briquets.	loy, f.o.b. shipping point, freight allowed. Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C. Eastern Central Western	Less ton lots\$2.10 \$2.1125 \$2.1445 Silcaz, contract basis, f.o.b. plant freight allowed, per pound. Carload lots
Eastern Central Western Carload, bulk . 3.85 4.10 4.30 Ton lots 4.75 5.35 5.65 Less ton lots 5.15 5.75 6.05	Ton lots 13.50 14.60 16.55 Less ton lots 14.25 15.35 17.30 Alloy 5: 50-56% Cr, 4-6% Mn, 13.50- 16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over. No. 1
Electric Ferrosilicon Contract price, cents per pound contained Si, lump size in carloads, f.o.b.	Eastern Central Western Ton lots 13.25 14.35 16.30 Less ton lots 14.00 15.10 17.05	No. 6
### Shipping point, freight allowed. ### Eastern Central Western ### 25% Si 11.65 ### 50% Si 7.45 7.95 8.15	Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% SI, 5-7% Mn, 5-7% Zr, 20% Fe.	Ton lots, per pound
75% Si 9.25 9.55 10.30 80-90% Si 10.45 10.75 11.50 90-95% Si 12.05 12.35 13.05	Eastern Central Western Ton lots 13.25 14.35 16.30 Less ton lots 14.00 15.10 17.05	Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0%, Al 1.0—2.0%. Ton lots. per pound 8.0¢

8.0¢

Oxygen in Steelmaking

(CONTINUED FROM PAGE 53)

low carbon rimmed and capped grades, is about $1\frac{1}{2}$ hr. The oxygen lances are 1-in. pipe, and are reported to last 20 to 30 min.

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A Chicago steel producer observed, in a discussion of carbon reduction practice, that for heats containing more than 1 pct C, the carbon reduction was quite slow; for heats containing from 1 to 0.20 C, carbon reduction was greatly accelerated with the use of oxygen, while in heats containing less than 0.20 C, carbon reduction slowed down again. He went on to state that the furnace roof appeared relatively cool and that internal cleanliness and surface quality of the steel produced was much better with the use of oxygen heats.

Several operators commented on the fact that sulfur was usually a little lower (in low carbon heats) when using oxygen than with ore practice.

A higher lance life is possible, it was brought out in one of the discussions, if the pipe is coated with slag before being immersed in the bath. A warning was also voiced against permitting the lance to get too close to the furnace bottom. One operator reported an experience wherein the lance touched the furnace bottom and cut a trough in the bottom as the lance was manipulated.

The discussions covering the use of oxygen for enriching the blast in blast furnaces was largely of a theoretical nature since there are no blast furnaces in this country now operating with oxygen blast enrichment. One such furnace (Bethlehem Steel) is expected to be operating with oxygen by this fall.

The only operating data on blast furnaces available are that reported by Lennings in Stahl und Eisen. W. A. Haven of Arthur G. McKee & Co. pointed out that Lennings reported a coke savings of 6.63 pct, using oxygen of 80 pct purity at the rate of 5126 cu ft per ton of pig iron. Haven projected Lenning's data to give an idea of the dollar savings possible with American practice and estimated that, using 48.7 pct Fe ores, a savings of \$1.00 a ton might be realized, assuming an oxygen cost of about \$4.80 a ton (a price other speakers indicated possible in tonnage plants producing 90 to 95 pct pure oxygen). Haven thought this figure might be raised to \$1.25 if consideration was given to certain phases of American practice not prevailing in Lenning's studies.

The whole question of oxygen enrichment of blast air, it was generally agreed, hinges on the availability of large tonnages of oxygen at costs substantially below present levels. The discussions of oxygen and blast furnaces all took for granted that such operation would be based on the so-called low purity oxygen running from 80 to 95 pct 0₂, since the possibilities of low cost oxygen rest entirely in that field.

In a discussion of the cost of producing oxygen, P. C. Keith, president of Hydrocarbon Research, Inc., reviewed developments, including wartime accomplishments in improving the efficiency of the Linde-Frankl process of oxygen making, which have led to making low cost oxygen production possible. Keith gave the following estimated costs for plants producing 90 to 96 pct oxygen at the various tonnages:

Capacity,	Capital cost	Oxygen cost,
Tons per day		per ton
100	\$ 940,000	\$4.29

400	 1,900,000	2.59
1000	 2,950,000	2.01

These figures, Keith said, were based on a 15-year depreciation, allowing 2 pct annually for repairs and maintenance, and assuming steam costing $30_{\rm f}$ per 1000 lb as the primary source of power, water pumping at $0.4_{\rm f}$ per 1000 gal, and electricity at $0.5_{\rm f}$ per kw-hr. Plants of the type on which the cost data were based are actual plants, Keith said, having been built for use in such industries as petroleum.

A rather interesting speculation was made in Keith's paper to the effect that other gases, such as hydrogen, carbon monoxide and nitrogen, are produced as byproducts of oxygen production and that probably some metallurgical use could be found for these gases. This would, of course, enhance the economic possibilities of the oxygen-producing unit.

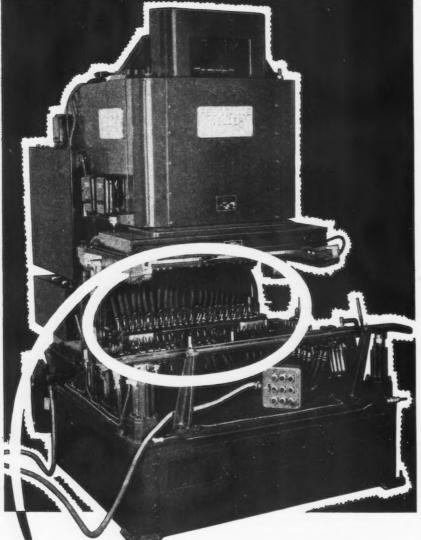
In the course of the discussions on blast furnace air enrichment it was pointed out that the limiting factor to the degree of enrichment practicable might be the quantity of blast furnace gas produced. When using normal air, 86 cu ft bosh gas is produced per pound carbon; enriching the air to 25 pct oxygen decreases the gas volume to 75 cu ft, while enriching the air to 30 pct oxygen further decreases bosh gas volume to 65 cu ft. Another speaker, with a different approach to the subject, stated that 1 lb carbon required 71 cu ft normal air for combustion or 60 cu ft of 25 pct oxygen or 50 cu ft of 30 pct oxygen. Since the same degree of heat is produced per unit volume, less total heat will therefore be produced, unless the blast is superheated to make up the deficiency.

One operator suggested that recirculating the top gases, when using enriched air, might be the most likely way in utilizing oxygen in the blast furnace. Another expressed the thought that oxygen could be a substitute for high top pressures, since increasing oxygen enrichment causes an increase in CO pressure in the exhaust gas. This increase in CO pressure has the same effect, and maybe is cheaper, to obtain the same results as obtained from top pressure.

Bever, assistant professor, MIT, outlined the changes that might be required in the design of the conventional blast furnace if oxygen-enrichment is to be properly and economically utilized. His observations, although strictly of an empirical nature, were nevertheless interesting and did present some food for thought.

The theoretical discussions stressed the need for further work on the subject of heat transfer, particularly as affected by oxygen-enrichment. There appeared to general agreement, however, that the use of enriched blast would result in increased production and with an overall fuel economy.

Throughout all the discussions of oxygen use at the conference there ran a note of caution, for it was apparent that many material and operating problems must yet be solved before the new ideas can be adopted as routine practice. Such problems as fast scrap charging, metal handling capacity, and possibly refractory life were mentioned. Too, there is the possibility that a decrease in openhearth time may be negated by the inability of soaking pits or blooming capacity to handle the greater output. The consensus of opinion appeared to be that while the use of oxygen had much promise as a means of increasing output and/or reducing costs, there still exist many major problems to be overcome before the full benefits of oxygen can be realized.



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RW-

WAA Reports Sale Of Steel Casting Facility, Landing Gear Plant

Washington

• • • A government-owned steel casting facility adjoining the plant of McConway & Torley Corp. in Pittsburgh has been sold to that firm for \$337,500. Built at an original cost of \$1½ million to expand production of armor plate by some 2500 tons a month, it could not be operated independently. It consists of a main foundry building connecting with the main foundry of the plant.

Sale of an aircraft landing gear plant at Buffalo, formerly operated by the Uebelhofer Bros. Inc., to H. G. Wipperman of Buffalo has also been announced by WAA. Sales price of the million dollar property was given as \$250,000 of which \$100,000 cash is paid for the real property and the remainder is for machine tools now in the plant and which will be selected for purchase later.

The new owner has announced that he will convert the plant into a tools, fixtures and die manufacturing plant which will provide employment for at least 375 workers. His plans also include the installation of a stamping press.

One building of Alcoa's wartime aluminum forging plant at Canonsburg, Pa., has been leased to L. H. Smith, Inc., Pittsburgh. Pa., for 5 years at an annual rental of \$21,037. The lease may be renewed for an additional 5 years.

The Smith company plans to use the structure as a hardware warehouse and to employ 75 persons.

National Works Investment

ondon

• • • Belgium intends to invest 353,000 million francs (\$8000 million) over the next 10 years for works of national importance, according to information recently published by the Belgian Ministry of National Re-Equipment. Of this total 212,100 million francs (\$4800 million) is to be invested in industry generally, 9500 million francs (\$200 million) in iron and steel, and 13,500 million francs (\$300 million) in metal works.



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Powder Metallurgists To See Movie, Exhibits At New York Meeting

New York

• • • A sound motion picture of the part played by powder metallurgy in aviation, produced by the Army Air Forces, and exhibits of 14 manufacturers of metal powders, metal powder products and equipment will be new features of the Third Annual Spring Meeting of the Metal Powder Assn. at the Waldorf-Astoria Hotel, New York, on May 27, 1947. The meeting will also include a number of original technical and economic papers on powder metallurgy delivered by many leaders in the industry.

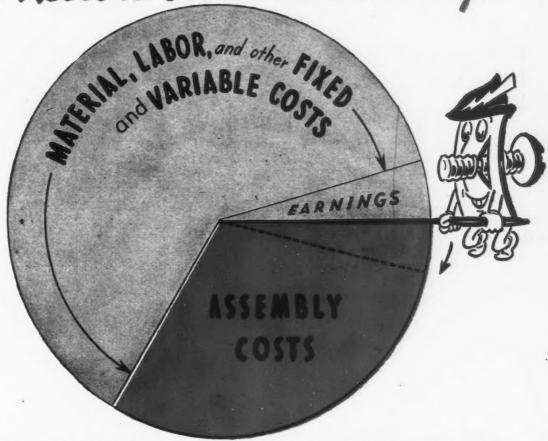
The morning session of the meeting is expected to hear papers on "Stainless Steel Powder," by John D. Dale of Charles Hardy, Inc.; "New Developments in the Production of Metal Powder Parts," by E. E. Ensign of the Ford Motor Co., and "Cost Calculations in the Production of Powder Metallurgy Parts," by Dr. Henry H. Hausner, consulting engineer connected with Rutgers and New York Universities.

The afternoon session will be devoted to the 20-minute motion picture prepared by the Air Forces and a panel discussion of "Post-War Powder Metallurgy," which will be presided over by R. P. Koehring of the Moraine Products Division of General Motors Corp. Members of the panel will include E. H. Kelton of the New Jersey Zinc Co. speaking on "Air Classification of Sub-Sieve Particles," A. J. Langhammer of the Amplex Division of Chrysler Corp. on "Bushings, Bearings and Allied Fields," E. R. Darby of Federal-Mogul Corp. on "Copper-Lead Lined Steel Back Bearings," Erle I. Shobert II of Stackpole Carbon Co. on "Electrical and Electronics Field," and Ernest Schefler of Metals Powder, Inc., on "The Use of Metal Powders in the Manufacture of Flake Powders.'

While the program is still to some extent tentative and one or two additional topics may be added, no major changes from those announced are expected. Exhibits will open and registration will begin in the Hotel's

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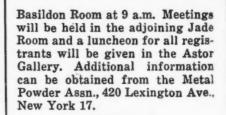
In France: Aerocessoires Simmonds, S.A., Paris In Australia: Aerocessories, Pty. Ltd., Melbourne







TENINGS



Steel Industry Ranks Among Hardest Hit By 1946 Work Stoppages

Washington

• • • Iron and steel, automotive, machinery (excluding electrical), electrical machinery, and mining industries were hardest hit in 1946 by strikes and work stoppages, according to data just re-leased by the Bureau of Labor Statistics. Idleness exceeded 10 million man-days in each of these industries.

In the transportation, communication and public utilities industries, the time-loss approximated 9 million man-days each. Wages were the chief point of controversy in all disputes, the BLS revealed, and involved three out of

four striking workers.

Although the AFL union affiliates were responsible for a majority of the 1946 shutdowns, the figures further showed a far greater number of CIO affiliated workers were involved in the dis-

More specifically, unions affiliated with the AFL took part in about 55 pct of 1946 stoppages, although on the basis of workers involved, the disputes actually involved about 1,680,000 AFL workers or 34 pct of the year's stop-pages with about 2,070,000 workers or 42 pct of the total involved. Independent unions with 13 pct of the workers were responsible for about 6 pct of the year's strikes.

Nearly one-half of the strikes concerned wages while one out of 10 were over the closed shop issue although only about 5 pct of the total workers were involved. Jurisdictional or union rivalry disputes affected about 1 pct of the workers although accounting for 3.5 pct of the total number of strikes.

A summary shows a total of 116 million man-days directly lost through strikes, of which 82 million were in manufacturing establishments. No figures given for indirect time lost. ...



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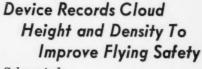
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Schenectady

•••• To improve flying safety, the Army and Navy have ordered 125 General Electric ceilometers for installation at military and naval airports throughout the country. The ceilometer system,



a pulsating light device coupled with a photoelectric detector, provides a continuous automatic recording of cloud heights and relative densities in daylight and at nighttime, information vital to pilots scheduled to land or take off from an airport.

The complete ceilometer system comprises a mercury arc projector, a photoelectric detector, and a recorder which provides a continuing and permanent record of cloud variations. A tiny superhigh-intensity quartz mercury lamp, mounted at the focal point of a searchlight mirror, throws a 120-cycles - per - second pulsating beam vertically into the sky. The quartz lamp, operating at an extremely high temperature, is cooled by a blast of air at each end of the arc to prevent overheating.

The beam, although invisible to the eye in daylight, is readily scanned by the ceilometer. This unit consists of a photoelectric tube pickup and amplifier feeding to an output meter. It is located





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Voluntary Cash Sickness Benefits Protect Half Of N.Y. State Workers

New York

 Nearly one of every two workers on New York State is protected by voluntary forms of cash sickness benefits and sickness compensation, according to a survey just completed by the National Industrial Conference Board. The survey was prepared by Dr. Earl E. Muntz, professor of economics, New York University; Dr. Acheson J. Duncan, associate professor of economics, The Johns Hopkins University; Dr. Elizabeth W. Wilson; and Sidney Borden, staff associate of the conference board. The most comprehensive investigation of this field ever undertaken by a nongovernment agency, the study discloses that between 40 pct and 50 pct of the workers now under the unemployment insurance law are covered by voluntary cash sickness benefit programs.

The conference board study, sponsored by the Associated Industries of New York, covered nearly 900,000 workers. It included nearly a third of all workers in the state who are employed by establishments with 25 or more on their payrolls. For all establishments, regardless of size, the NICB sample covered 23.7 pct of the 3.8 million workers covered by the New York State unemployment insurance laws.

In addition, labor unions furnished figures to the conference board on nearly 400,000 of their members. The union membership total added to those surveyed independently by the conference

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board brought the total workers surveyed to over 1.3 million, or approximately one in three of those covered by state unemployment insurance.

The percentage of workers protected against wage losses stand highest in petroleum, communications and utility industries where nine of every ten workers are covered. Fewest employees are protected in the service and construction groups.

Within the sample taken, the extent of employee coverage was found to increase directly with the size of the company. Establishments with a thousand or more workers reported that 89 pct of their employees were protected against illness costs. In contrast, only 39.2 pct of workers in establishments with 25 to 99 on their payrolls were thus protected. For establishments with 100 to 199 employees, the percentage covered jumped to 62.5 pct. Firms with 200 to 499 workers reported a slightly higher figure, while firms employing 500 to 999 reported a coverage of 82.2 pct.

In almost half the cases included in the conference board sample, covered employees pay none of the costs of the cash sickness benefit programs. Slightly more than a third share the cost of such protection with the employer. The remainder pay the entire cost without assistance from the employer. These figures do not include contributions made by the employer in terms of office space, employee officials' time, and other assistance in the administration of the program.

In programs where the costs are shared by employer and employee, the 50-50 method of distributing costs is the most popular. Of the 35.1 pct of the cases where costs are shared, a third split the costs evenly. The employer paid between 40 pct and 60 pct of the costs of the program in more than half the cases where these costs are shared.

"If union programs obtained through collective bargaining are included (with the conference board sample)," the analysis points out, "the percentage of employees for whom the employer pays the whole cost would be considerably larger than half. It is probable that from 60 pct to 70 pct of the covered employees in New

Improved Protection Against Overtravel with new Weight-Operated Limit Stop



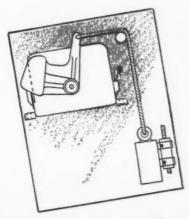
Now, a weight-operated Safety Limit Stop for the smaller horsepower crane-hoists. Tripped by weighted operating-lever when the danger zone is reached . . . reset automatically by suspended weight when controller is reversed to lower the hook-block. Other advantages are:

No lubrication required—Oilite bearings are self-lubricating and long-lived. This means that the costly and sometimes forgotten item of lubrication-maintenance is eliminated forever.

2 Compact—easy to mount—Small, over-all dimensions—four convenient mounting holes—one suspended weight.

3 Small reset travel—High crane lifts are possible with this new No. 10-W because the amount of travel between "run" and "tripped" positions has been kept at a minimum.

4 High interrupting capacity—Two normally open and two normally closed contacts, mechanically interlocked and with wide, vertical opening, always assure positive interruption of the hoist motor current.



Send for Bulletin 1032 which gives complete details for applying Youngstown Safety Limit Stops to both new and old cranes, either a.c. or d.c.

> Optional Style—with offset weightedarm which eliminates intermediate sheaves when Stop is not mounted directly over crane hook-block. Available on all sizes of EC&M Youngstown Limit Stops.

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York State would make no direct contribution."

During World War II, there were marked increases in disability rates in industry. "The recent rise in disability rates," the study remarks, "has carried them far above heights previously recorded and the 1945 levels were far out of line with experience during the last decade and probably during the last two decades.

"The principal reason for the rise in disability rates during the war years was an increase in the number of claims rather than an increase in the severity or duration of disability."

An analysis of wartime morements in paid disability in 14 companies (1940-1945) showed a median increase of 76 pct in the average annual disability rate. The smallest increase in this group was 24 pct, while the greatest increase was 142 pct during those war years. Until the nineteen thirties, cash sickness benefit programs were largely isolated undertakings by employee benefit associations, labor unions, or individual companies. Fraternal societies and insurance companies selling individual contracts wrote some accident and health insurance, but it was not a large part of their total contracts.

Beginning in the thirties, however, group accident and health insurance rapidly came into favor. In 1934, there were 1,650,000 employees in the United States and Canada who were protected by group accident and health policies. During the next 10 years, there was an increase of almost 300 pat in the number of persons covered by such contracts (6.5 million in the United States and Canada). By 1945, nearly 6 million employees in the United States had been brought under the protection of such plans.



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Approves Bill to Set Up Subsidies For Output Of Lead, Copper, Zinc

Washington

• • • The Mines and Mining Subcommittee of the House Public Lands Committee has approved the Russell bill (HR-2455) which would set up within the Interior Dept. a Mineral Resources Div. and would continue for 5 years the payment of premiums on production of copper, lead and zinc.

It is scheduled to be taken up by the full committee on May 6 although there is a slight possibility that it may be considered at a meeting slated for this week.

Combining the major provisions and objectives sought in several other bills, backers of the Russell bill are confident that it will be approved by the full committee and passed by the House without major change.

As it stands, the proposed Mineral Resources Div. would take over and continue premium payments with the maximum payments based on a return to the producer of 18ϕ a lb on lead and zinc and 28ϕ on copper. These maximum limits would not apply in cases where special consideration is believed necessary to stimulate exploration or production.

The measure would also permit extension of premiums to other critical metals if necessary but in no case would the total maximum payments be permitted to exceed \$100 million in any one year.

Backers of the measure feel that in view of the dwindling reserves of copper, lead and zinc, cost of production is not so important to the nation as supporting the price in order that marginal and high cost mines would be enabled to extract the last possible pound of ore before closing down.

While the Interior Dept. disapproved the original Russell bill and is said to be only lukewarm toward the revised version, its passage is strongly advocated by such groups as the Southwest Mining Assn., Arizona Small Mine Operators Assn., New Mexico Miners & Prospectors Assn., Colorado Mining Assn., Butte Development Assn., Tri-State Zinc & Lead Ore Producers Assn., and the In-

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THE IRON AGE, May 1, 1947-145

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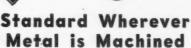
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ternational Union of Mine, Mill & Smelters Workers.

It is claimed by Rep. Herbert A. Meyer (R-Kan.), whose district takes in part of the Tri-State area, that unless the premium payments are extended or some such legislation enacted to keep up production while the mines are free of water, and machinery and labor are available, much of the nation's reserves would be lost.

It is estimated that about 60 pct of the U. S. copper reserves have been used up, 65 pct of zinc, and 85 pct of lead. Unless new fields are found it is believed copper will be exhausted in 10 years and lead in 12 years.

Exploration and development of new fields would be encouraged under the measure and the metal mined under the premium payments would be offered on the open markets except such quantities as might be needed for the permanent stockpile.

WAA Transfers Tool Sale

hicago

• • • WAA has transferred the jurisdiction over sale of machine tools and other equipment in three Milwaukee war plants from Chicago to Minneapolis. There will be no change in the administrative service of War Assets Milwaukee district office, headed by director W. V. Reilly.

The three properties being transferred consist of the machinery and other equipment located at three war plants which have already been sold to private buyers. Machinery will not be moved from its present location before being sold. The plants involved in Milwaukee are the aircraft parts plant, operated by A. O. Smith Corp. during the war; the supercharger plant operated by Allis-Chalmers; and the aircraft parts plant at Butler, Wis., operated by A. O. Smith. A brochure listing 62 items of machines, which originally cost approximately \$1 million has been mailed to prospect buyers. Milwaukee buyers may obtain the brochure at the customer service center and get instructions on ordering the surplus equipment.

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Tool Steel Men Compile Data for Forthcoming ASM Metals Handbook

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• • • Twelve of the nation's technical leaders in the tool steel industry, members of the tool steel committee, American Society for Metais, have completed their correlation of data in connection with ASM's 1947 Metals Handbook, first to be published since the 1939 edition.

Names of the committee which since 1940 has been engaged in preparing the latest data on tool steels were made public by W. H. Eisenman, national secretary of

The handbook's tool steel committee consists of S. C. Spalding. chairman; American Brass Co., Waterbury, Conn.; W. L. Badger, General Electric Co., West Lynn, Mass.; A. D. Beeken, Vulcan Crucible Steel Co., Aliquippa, Pa.; J. P. Bindyke, Heppenstall Co., Pittsburgh; G. E. Brumbach, Carpenter Steel Co., Reading, Pa.; W. R. Frazer, Union Twist Drill Co., Athol, Mass.; W. H. Macmillan, Remington Arms Co. Inc., Bridgeport; W. E. Mahin, Armour Research Foundation, Chicago; J. H. McCadie, National Twist Drill & Tool Co., Detroit; J. E. McCambridge, U. S. Navy Yard, Philadelphia; H. E. Replogle, Universal-Cyclops Steel Corp., Bridgeville, Pa.; and G. A. Roberts, Vanadium-Alloys Steel Co., Latrobe, Pa.

Seventeen articles summarizing heat treatments recommended for the tool steels used in industry have been prepared by the committee for inclusion in the handbook.

In order to correlate the large amount of information available and to reduce the number of steels to manageable proportions, it was necessary to prepare a condensed tabulation of tool steels according to the principal types that are used. Thus, the field of these special steels was reduced to approximately 50 principal types, which are the ones that will be discussed in the forthcoming Metals Hand-

With both producers and users of tool steels represented in the manuscript, the final summary of information can be accepted as an

authoritative and generally acceptable compilation.

The 1947 Metals Handbook will be distributed to more than 21,000 ASM members in the United States, Canada, Europe and Asia. It also has a substantial distribution in domestic and foreign research and plant laboratories, libraries and technical colleges and universities.

WAA Sells Over 1000 Surplus Kitchen Cars And Troop Sleepers

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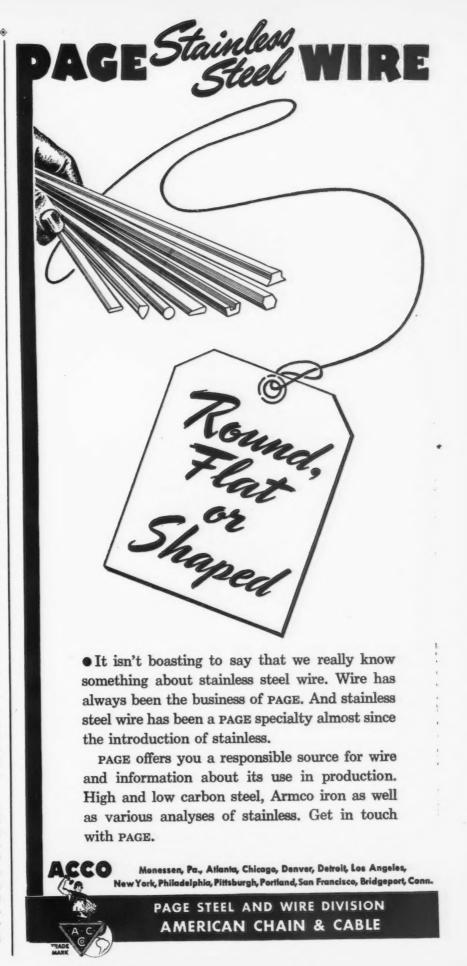
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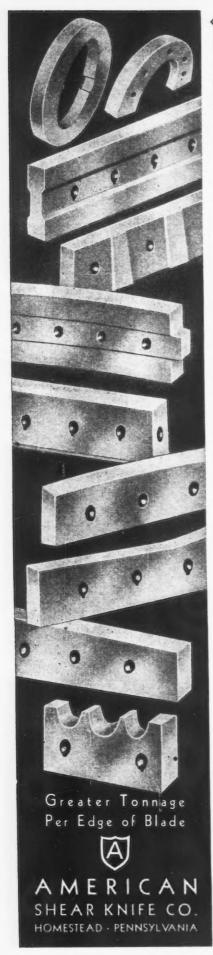
• • • More than 1000 of the 2300 troop sleepers and kitchen cars being offered by WAA have been sold. A check of transportation companies reveals that some of the railroads will use the cars for maintenance of way and wrecking crews. The sleeping cars, which cost the government about \$12,000 each, are being sold at a fixed price of \$2880 or \$3780 each, depending upon construction. The kitchen cars are priced at \$3240.

It was the railroads' former practice to convert old box cars for this purpose, but freight cars are so badly needed that none can be spared for reconversion to maintenance of way cars. One railway official stated that the WAA cars are fully equipped with steam lines and heating apparatus, are insulated, making them ready for use without changes.

By purchasing these cars the railway can release 300 freight cars now in use for purposes other than hauling goods. One transportation official whose company purchased 300 of the government-owned cars said that since all cars are equipped with high speed trucks and passenger car couplings, his company will use them in passenger trains for mail and baggage cars.

It was the original plan when the cars were built that they could be converted to ordinary freight cars. The transportation companies who studied the cars after the war concluded that to remove the passenger car couplings and high speed trucks, install side doors for freight and close windows, and otherwise modify for freight use, would cost more than to build new box cars.





London Economist

(CONTINUED FROM PAGE 113)

nesia and Greece. That was 15 months before the Truman Doctrine was announced to the world. Obviously nothing could be more welcome, nothing more likely to pacify Europe, than a joint effort of the Great Powers to carry through its reconstruction.

And an American loan to Russia is the only quick device that might divert the Russians both from their insistence on reparations in goods from Germany and from their plans to mobilize the resources of eastern Europe to help the Five-Year Plan. But one does not get loans by shaking the lender's faith in the borrower; and this is what Mr. Molotov has been doing these months past. Indeed he and his colleagues have done more; they have created the suspicion that Moscow regards the economic recovery of Europe west of the Elbe as against Russia's interest.

Let us take another of Wallace's specifics. He says that the way to overcome the present crisis in Russian relations with the West is for the United States to return to the principles of the United Nations. This means, he said in London, "an agreement on world control of atomic energy, and other weapons of war destruction, the internationalization of strategic areas, including the Dardanelles, Suez Canal and Panama Canal."

How, precisely, would he overcome Mr. Gromyko's defense of national sovereignty in the debates on atomic control? What would he do if he satisfied himself that Gromyko's instructions are to play for time?

As for the Dardanelles, whose fault is it that nothing has come of the proposal made to the Russians 2 years ago that the Powers should meet with Turkey and revise the Montreux Convention? Was it not Moscow that pressed on the Turks in private negotiations last year the idea that the security of the Dardanelles should be guaranteed by the Black Sea Powers onlythat is to say, by Russia, Turkey, and the satellite governments of Rumania and Bulgaria? What has this to do with the internationalization and the United Nations?

Then—to take a matter that seems trivial against the back-ground of strategic thinking and

power politics that Wallace detests—what would he say about the matter of the 15 Russian women who are not allowed to leave their country and join their husbands in England? A progressive can nowadays look over and beyond such things to the wider horizons and the overall blueprints; there was a time when he would not have dared remain silent about such a piece of petty tyranny and heartlessness.

It is the kind of symptom of national behavior that ordinary men and women pick out of a BBC news bulletin containing far more momentous news. How would Wallace handle this problem? Would he try to drive a bargain on such a matter

of principle?

There is a good deal in Wallace's voca bulary and argumentation which recalls the worst days of the thirties in this country, when jargon, sentimentalism and wishful thinking ran riot. Typical is the argument that communism "can only be ended when poverty and exploitation are no longer a part of democracy." It is the argument Communists use in the company of liberals.

No one will deny that communism thrives where there is poverty and social injustice; but it is equally true that communism thrives on men's love of power, excitement and conspiracy. With his faith in the potentialities of all men, Wallace overlooks, or deliberately ignores, what Hobbes 400 years ago placed first among the factors to be reckoned with in politics: "A perpetual and restless desire of power after power, that ceaseth only in death." This is the human characteristic which makes Communists conspire so efficiently; for the prize they aim at is complete—not shared

Surely Wallace's hosts can explain to him that no one expects the Communists everywhere to give way to the Socialists and Radicals just because the latter promise "an international new deal." And while Wallace's deal is being prepared, who is to prevent the internal collapse of the countries in which Communists aim at complete power, whether for themselves alone or for Russian foreign policy?

If Wallace's arguments are unacceptable, so is his flattery. He suggests that the world is agog to see how Britain will reconcile planning and freedom. It is quite obviously not true; in Europe

Britain is living on the prestige won during the war and the curiosity there is about our prospects of remaining strong though socialized.

As for Wallace's advice that Britain should take up a position somewhere halfway between the United States and Russia, that comes of bad observation and loose thinking. The British position is different from the American on many issues. But it cannot be halfway to the Russian. There are too many political, legal, economic and social principles on which the American and British people agree for such a maneuver to be performed by the British without sacrifice of faith and traditionand interest too.

It is very unfortunate for Wallace that the draft Russian suggestions for the revision of the treaty of alliance with Britain should have become known during his visit. He has come here with the curious purpose of pushing Attlee's Britain away from Truman's America.

That is precisely what Mr. Molotov would like to do too. But Molotov is not a progressive; he is intensely interested in the present and very sore about the past. He believes in the United Nations only in fits and starts, and in international new deals not at all. When Mr. Marshall suggested recently that the products of the territories transferred from Germany to Poland should be used in the interests of Europe as a whole, Molotov turned the idea down flat. The strategic thinking which Wallace deplores, Molotov takes for granted. While Wallace is impatient for the new deal in his time, Molotov waits with massive patience for his opponents to fall out among them-

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Mr. Wallace's visit may do much harm. He will rally all those who think with their emotions. He will encourage all those on the Left—and they are many—who do not think about foreign affairs at all, but merely wait to observe what the Right think, and then shout the opposite.

In wider circles of the general public, the charm and impressiveness of his manner, the striking resemblance of his radio technique to that of Mr. J. B. Priestly—king of progressive broadcasters—and his association with the late President Roosevelt and the social engineering of the New Deal will gain supporters for the critics of Bevin.



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The Foreign Secretary very honestry makes it reign policy sound difficult; Wallace makes it sound easy, although he must know, from his own experience of anairs, that it is not easy. To pretend otherwise is to make a fool of the common man for whom he speaks.

The people of France and of the other countries that he is visiting will be less ready to applaud uncritically the vision offered by this new world statesman. There they have longer memories, sharper eyes for the present, and cautious habits of thinking about the future; the editor of the *New Republic* focuses exclusively on the horizon.

There is one point—and one point only—at which it is possible to reconcile Wallace's views and British interests. That is where he emphasizes the urgent need for eventual American understanding with the Russians. That must be the objective of British, as well as of American, policy.

But there is no evidence that the Russians will come halfway towards such an understanding until they are convinced that Mr. Marshall—and Mr. Bevin—are standing absolutely firm. That they cannot do without the support of Congress and the House of Commons. In trying to undermine this support Mr. Wallace is doing a disservice to all three governments.

British Atomic Center

London

• • • The former Imperial Chemical Industries factory at Salwick, near Preston, Lancashire, is being reconverted for use as a British atomic research and development center. Its activities will cover the refining of pitchlende concentrates, their reduction to metal, and the machining and finishing of uranium metal rods which will be sent elsewhere for further processing.

About 900 men are now employed in building work and erecting machinery, where production should begin in the late autumn of this year. When production is in full swing the factory will need 1000 workers. Aluminum bungalows and permanent houses will be built in the Preston area to accommodate the staff.

The factory was erected during the war in a village which has only a few houses and farms. The strictest watch is kept on visitors.

Allis-Chalmers General Machinery Div. Sets Up New Field Organization

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• • • Allis-Chalmers Mfg. Co., under a newly adopted regional setup for the field organization of the general machinery division, have changed their branch offices in the new regions to district offices.

In the New England region, A. B. Frost and R. H. Porterfield are managers of the New Haven and Providence district offices, respectively. This region comprises the States of Maine, New Hampshire, Vermont, Massachusetts. Connecticut and Rhode Island. In the southwest region, W. R. Horrigan, Aubrey Phillips, E. R. Hury, L. G. Park and R. I. Moore have been appointed managers of the Amarillo, Houston, San Antonio, Shreveport and Tulsa district offices, respectively. This region encompasses Texas, parts of Arkansas, Oklahoma, Kansas, Louisiana, New Mexico and a portion of the state of Coahuila. Mexico.

In the southeast region, J. J. Greagan, William Parker, J. W. Roberts, G. H. Hoffman, A. R. Knauss, Joseph Bronaugh, R. F. Muller and A. D. Robertson are managers of the Birmingham, Charlotte, Chattanooga, Knoxville, Memphis, Miami, New Orleans and Tampa districts. This region covers North and South Carolina, Georgia, Florida, Alabama, Tennessee, Mississippi, a portion of Arkansas and Louisiana and three counties in Missouri.

In the Pacific region, F. V. Sams, F. Harvey Searight, U. E. Sanderlin will remain as managers of the Portland, San Francisco and Seattle district offices reporting directly to A. J. Schmitz, manager of the region, which covers California, Nevada, Oregon, Washington, northern Idaho and three counties in Montana. A. R. Kohlmetz remains as manager of the Spokane branch of the Seattle district.



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General Motors Sees Automobile Production At 4-5 Million Cars

Detroit

• • • Gazing intently into its crystal ball General Motors sees the following production figures for 1947.

Given labor peace and a "nearnormal flow of materials," the automobile industry should produce between 4½ and 5 million cars and trucks in 1947, according to GM management. Assuming GM holds its traditional share of 45 pct of the total, GM's production will be about 2 million units.

Looking further into the future, GM management thinks the automobile industry should be able to produce close to 6 million cars and trucks in 1948.

GM management sees no indication at present of a substantial drop in customer demand for automobiles nor does it look for any rapid decline in the immediate future. GM car divisions report they still have an unprecedented number of unfilled orders on their books and GM, at least, is convinced that sales volume should continue at or near present levels.

GM reports an improvement in worker absenteeism rates, which is described as "one of the primary causes for lowered worker productivity immediately after the war ended." During the spring and summer of 1946, for instance, absenteeism in GM plants was running as high as 5 pct; the present rate is lower GM says and and it is hoped that the prewar average of 2 pct will soon be attained.

While most plants are still plagued by uncertainty with respect to raw materials, GM indicates that conditions are now somewhat improved over the material situation prevailing during the summer of last year. Flat-rolled steel, pig iron, copper and lead are critical items which are likely to hold production to the level of the last 3 months of 1946 or about 80 pct of the 1941 rate, according to GM management. This operating rate will likely prevail for the first 9 months of this year. However, if promises of increased steel facilities are fulfilled, GM thinks that production during the last quarter of 1947 should equal the 1941 rate GM has high praise for its returned war veterans. According to management the veteran discharge rate has been only two-

to management the veteran discharge rate has been only twotenths of 1 pct discharges for cause, which is believed to be the best record in all industry.

In making this information available to GM salaried men and women through a company publication, "As A Matter Of Fact," GM top management is careful to point out that significant changes in business and economic conditions may alter the picture virtually overnight.

Suggests Three More Guaranteed Market Contracts to RFC

Washington

• • • Three additional guaranteed market contracts—two for prefabricated homes and the third for fabricated wall panels—have been recommended to RFC by Housing Expediter Frank R. Creedon.

Under the contracts, Home Builders Corp. of Atlanta would produce 750 plywood panel type homes in 1947 for the housing program and Metal Homes Co. of Los Angeles would build 200 steel panel units this year.

Outer walls, ceiling, gable ends and roof of the Metal Homes unit would consist of steel panels and aluminum foil would be used for insulation. It would have 855 ft of floor space for a price of \$6660 as compared with 672 ft for the wooden type house which will selfor about \$6030.

An RFC loan of \$109,000 has been granted the Metal Homes Co. as an aid to getting into production.

While the recommended contract to ATF, Inc., of Elizabeth. N. J., manufacturers of printing machinery and tubular furniture, covers production of wall panels only at the Weehawken plant, the firm has advised Mr. Creedon that it will provide machinery, equipment and materials for a number of similar plants throughout the country. Under the contract, the company is to produce 900,000 sq ft of panels—enough for 1000 single family units.

The hollow concrete panels will

be sold under the trade name of "Fabricon." They will be 8 ft long, 4 ft wide and 4 in. thick.

New Belt Will Raise 600 Tons of Coal Per Hr to 715-ft Height

Akron, Ohio

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• • • Raising 600 tons of coal per hr to a height of 715 ft will be accomplished by a new rubber conveyor belt under construction in the Goodyear Tire & Rubber Co. plant here.

W. C. Winings, manager of Goodyear's Mechanical Goods Div., and E. W. Stephens, head of the conveyor belt department, stated that this is the greatest height ever attempted in a conveyor belt operation.

A half-mile long, the belt will be used by the Tennessee Coal, Iron & R. R. Co., a U. S. Steel subsidiary, in its new Concord mine near Birmingham, to deliver coal from the bottom of the slope to a tipple at the mine's mouth. The mine is expected to begin operations late this year.

Forty-two inches wide, the belt will utilize more than 330 steel cables, each endless inside the belt's circumference. Each cable in turn, consists of finely stranded, high-tensile steel wire. This wire was furnished by the American Steel & Wire Co.

When completed, the belt will weigh 42 tons. It will be delivered to the Alabama mine in five sections and spliced into one continuous length at the scene.

The belt's surface is being made with a cover of 3/16 in. of especially-formulated synthetic rubber on the load-carrying top side, and one-sixteenth on the under surface, for a total belt thickness of about 5/8 in.

At the head pulley, where power is applied for bringing the coal up the slope from the mining level, two 300-hp motors will be utilized with one on each side of the pulley shaft. Total belt pull on the head shaft will be 68,000 lb.

As the giant belt ascends the half-mile slope, the rate of rise will be at an angle of approximately 17 degrees, according to Mr. Winings and Mr. Stephens.



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- ★ They withstand temperature extremes; are free from freezing hazard; are easily ventilated for rapid cooling.
- ★ They are foolproof electrically; are not injured by short circuiting, reverse charging or similar accidents.
- ★ They can stand idle indefinitely without injury. Merely discharge, shortcircuit, and store in a clean, dry place.
- ★ They are simple and easy to maintain.

Illustrated above is a material-handling job for which trucks must be kept on duty 24 hours a day, every working day. It is the kind of job in which battery industrial trucks excel because of their dependability and economy.

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